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THE STATE OF INTEGRATED AIR AND MISSILE DEFENSE

Laurel, MD

JULY 14, 2011

Agenda

WELCOME & ADMINISTRATIVE REMARKS

- Mr. John Reilly, Chairman, SLAAD Division

KEYNOTE ADDRESS 1

- UPDATE ON FINANCING OF IAMD AND EUROPEAN PAA, VADM John T. Blake, USN, DCNO for Integration of Capabilities and Resources, N8

JOINT AIR AND MISSILE DEFENSE COMMUNITY OF INTEREST (JAMD COI) OVERVIEW AND UPDATE

- Mr. Larry Smith, JAMD COI Coordinator, U.S. Army PEO Missiles and Space Program

ROLES AND IMPORTANCE OF CYBERWAR IN IAMD COMMAND AND CONTROL

- RADM Edward H. Deets, III, USN, Commander, Naval Network Warfare Command

AEGIS BMD UPDATE, WITH INSIGHTS INTO THE STATE OF EUROPEAN PAA AND AEGIS ASHORE

- Mr. Scott Perry, Director of Program Integration, Alignment and Evaluation, Aegis BMD MDA
 - Aegis BMD Flight Testing Success .wmv
 - Broll .wmv

ALTBMD - NATO VIEW OF A PATH TO COMMAND AND CONTROL FOR THE EUROPEAN PAA

- Mr. Dave Kiefer, Deputy Program Manager, NATO ALTBMD

IAMD REQUIREMENTS, PLANS, AND PROGRAMS

- RADM Frank Pandolfe, USN, Director, Surface Warfare Division (N86)

THE STATE OF INTEGRATED AIR AND MISSILE DEFENSE AGENDA 14 July 2011

- 7:00 a.m. - 8:00 a.m. **REGISTRATION & CONTINENTAL BREAKFAST**
- 8:00 a.m. **WELCOME & ADMINISTRATIVE REMARKS**
Mr. John Reilly, Chairman, SLAAD Division
Mr. David Cela, Chairman, MD Division
Mr. Conrad Grant, Department Head, Air & Missile Defense, JHU/APL
- 8:05 a.m. **STRIKE, LAND ATTACK, AND AIR DEFENSE DIVISION UPDATE**
Mr. John Reilly, Chairman, SLAAD Division
- 8:09 a.m. **MISSILE DEFENSE DIVISION UPDATE**
Mr. David Cela, Chairman, Missile Defense Division
- 8:13 a.m. **AGENDA OVERVIEW AND INTRODUCTION OF SPEAKERS**
Stephen Woodall, Ph.D., Symposium Chairman
- 8:15 a.m. **KEYNOTE ADDRESS Nr 1 --- UPDATE ON FINANCING OF IAMD AND EUROPEAN PAA**
VADM John T. Blake, USN, DCNO for Integration of Capabilities and Resources, N8
- 8:45 a.m. **KEYNOTE ADDRESS Nr 2 --- MDA in IAMD OVERVIEW**
Lieutenant General Patrick J. O'Reilly, USA, Director, Missile Defense Agency
- 9:15 a.m. - 9:30 a.m. **BREAK**
- 9:30 a.m. **JOINT AIR AND MISSILE DEFENSE COMMUNITY OF INTEREST (JAMD COI) OVERVIEW AND UPDATE**
Mr. Larry Smith, JAMD COI Coordinator, U.S. Army PEO Missiles and Space Program
- 10:15 a.m. **ROLES AND IMPORTANCE OF CYBERWAR IN IAMD COMMAND AND CONTROL**
RADM Edward H. Deets, III, USN, Commander, Naval Network Warfare Command
- 11:15 a.m. **INSIGHTS INTO THE ACQUISITION OF NAVY IAMD CAPABILITIES**
RDML James Syring, USN, Program Executive Officer for Integrated Warfare Systems
- 12:00 – 1:00 p.m. **LUNCHEON/ SLAAD ANNUAL AWARDS/ OSD INSIGHTS ON THE STATE OF IAMD TODAY**
Mr. David Ahern, SES, Director, Portfolio Systems Acquisition, OSD (AT&L)
- 1:00 p.m. **EUROPEAN PHASED ADAPTIVE APPROACH (PAA) IMPLEMENTATION**
Mr. Richard W. Glitz, Technical Director for the Joint Integrated Air and Missile Defense Organization (JIAMDO), J8, Joint Staff
- 1:45 p.m. **AEGIS BMD UPDATE, WITH INSIGHTS INTO THE STATE OF EUROPEAN PAA AND AEGIS ASHORE**
Mr. Scott Perry, Director of Program Integration, Alignment and Evaluation, Aegis BMD MDA
- 2:30 p.m. - 2:45 p.m. **BREAK**
- 2:45 p.m. **ALTBMD - NATO VIEW OF A PATH TO COMMAND AND CONTROL FOR THE EUROPEAN PAA**
Mr. Dave Kiefer, Deputy Program Manager, NATO ALTBMD
- 3:30 p.m. **OVERVIEW OF THE STATE AND FUTURE OF NAVY IAMD**
RADM Stewart O'Bryan, USN, Commander, Navy Air and Missile Defense Command
- 4:15 p.m. **IAMD REQUIREMENTS, PLANS, AND PROGRAMS**
RADM Frank Pandolfe, USN, Director, Surface Warfare Division (N86)
- 4:55 p.m. **CLOSING REMARKS**
Mr. John Reilly / Chairman, SLAAD Division & Mr. David Cela / Chairman, MD Division
- 5:00 p.m. **ADJOURN**

Fianancing Integrated Air and Missile Defense



Briefing For NDIA SLAAD Symposium 14 July 2011

**Vice Admiral J.T. Blake
Deputy Chief of Naval Operations,
Integration of Capabilities and Resources (N8)**



Overview

- Fiscal landscape
- Lines of effort
 - Operating and sustaining the Fleet
 - Modernizing the Fleet
 - Recapitalizing the Fleet
- Summary



Budgetary Outlook:

Navy Priorities

- Build and maintain a rotational and forward-deployed global force
- Deliver core capabilities for deterrence, power projection, and sea control for access to the global commons, to assure allies, and prevail in conflict
- Balance available resources among
 - Modernization
 - Force structure
 - Readiness
 - Forward presence
 - Manpower
- Develop procurement plans that are stable, affordable, realistic and transparent



Budgetary Outlook: Navy Challenges

- Anti-access and Area-denial
- Balancing procurement with sustained operational demand
- Fielding a “whole force” in an austere fiscal environment
- Combatant Commander Demand for Naval Forces
- Preserving fragile maritime industrial base



Financial Outlook

- "We plan to reduce the Defense budget by \$400B over the next 12 years."
- "The Navy Budget for FY 12 is underestimated by \$64B due to rising prices and decreased purchasing power."



Integrated Air and Missile Defense: Operations and Sustainment

- Aegis Fleet
- Carriers and affiliated airwings
- Ballistic Missile Defense (BMD) elements
- Ordnance stores
- DOTmLPF and associated infrastructure
- O&MN account: Fleet maintenance, beans, bullets, and black oil



***Combatant Commander Demand For Navy IAMD
Capability / Capacity Is Increasing....without bound***



Operations and Support: A macro view

- Defense Department O&S costs are:
 - \$350B for FY12.....63% of DoD total...rising to 71% by 2030
 - Comprised of compensation, medical care, fuel and spare parts, etc.
 - Sensitive to spiraling medical care costs, pay raises for military and government civilians, and rising costs of everything from office supplies to aircraft fuel
- Biggest driver.....average cost to support each service member
 - 1980--\$55K
 - 2001--\$105K
 - 2010--\$211K

O&S consuming an increasing share of a declining topline.....adversely impacts both modernization and recapitalization



Integrated Air and Missile Defense: Operations and Sustainment

- Wholeness reviews require cash infusion to restore Fleet Readiness
- FY12 O&MN increments due to increased OPTEMPO:
 - Steaming days: +\$24B
 - Flying Hours: +\$252M
 - Ship Maintenance: +\$182M
 - AIMD: +\$92M
- BMD O&S transitioning from MDA to Navy: \$150M annually beginning in FY13
- O&MN account is further pressurized by fuel price volatility in execution year



O&S Bottom Line: Adverse trends in Fleet Readiness likely to continue due to real world operations



Integrated Air and Missile Defense: Modernization

- Aegis modernization is centerpiece of Surface IAMD program
- BMD ship Balanced Capability and Capacity plan is bridge to answer COCOM demand
- E-2D is game changer for Naval Aviation
- Three more years of F/A-18 buys required in APN



***Modernization Bottom Line: Urgently required to keep
Fleet warfighting capability relevant in IAMD***



Aegis Multi-Mission Surface Combatants

Warfighting Mission Area	22 Ships	CG Multi-Mission	62+ Ships	DDG-51 Multi-Mission
				
BMD	✓ (9 of 22)		✓	
Air Warfare	✓		✓	
Undersea Warfare	✓		✓	
Precision Land Attack	✓		✓	
Naval Surface Fire Support	✓		✓	



NIFC-CA/System Description

- **Mission:** NIFC-CA provides an Engage-On-Remote and Over-The-Horizon air defense capability using a sensor network in support of the full kinematic range of active missiles against manned aircraft and cruise missiles, overland and at sea.
- **Employment:** NIFC-CA uses the full capability of CEC and Link-16 to engage threats at significantly greater ranges.





Integrated Air and Missile Defense: Recapitalization

- DDG re-start key to future large surface combatant strategy
- DDG Flight III essential to pacing emerging A2AD threat
- BMD is a growth industry....DDG 112 and up built from keel up with advanced capability
- JSF key to keep Navy Air competitive with the threat



Recapitalization Bottom Line: New technology landing pad to cope with burgeoning IAMD threat



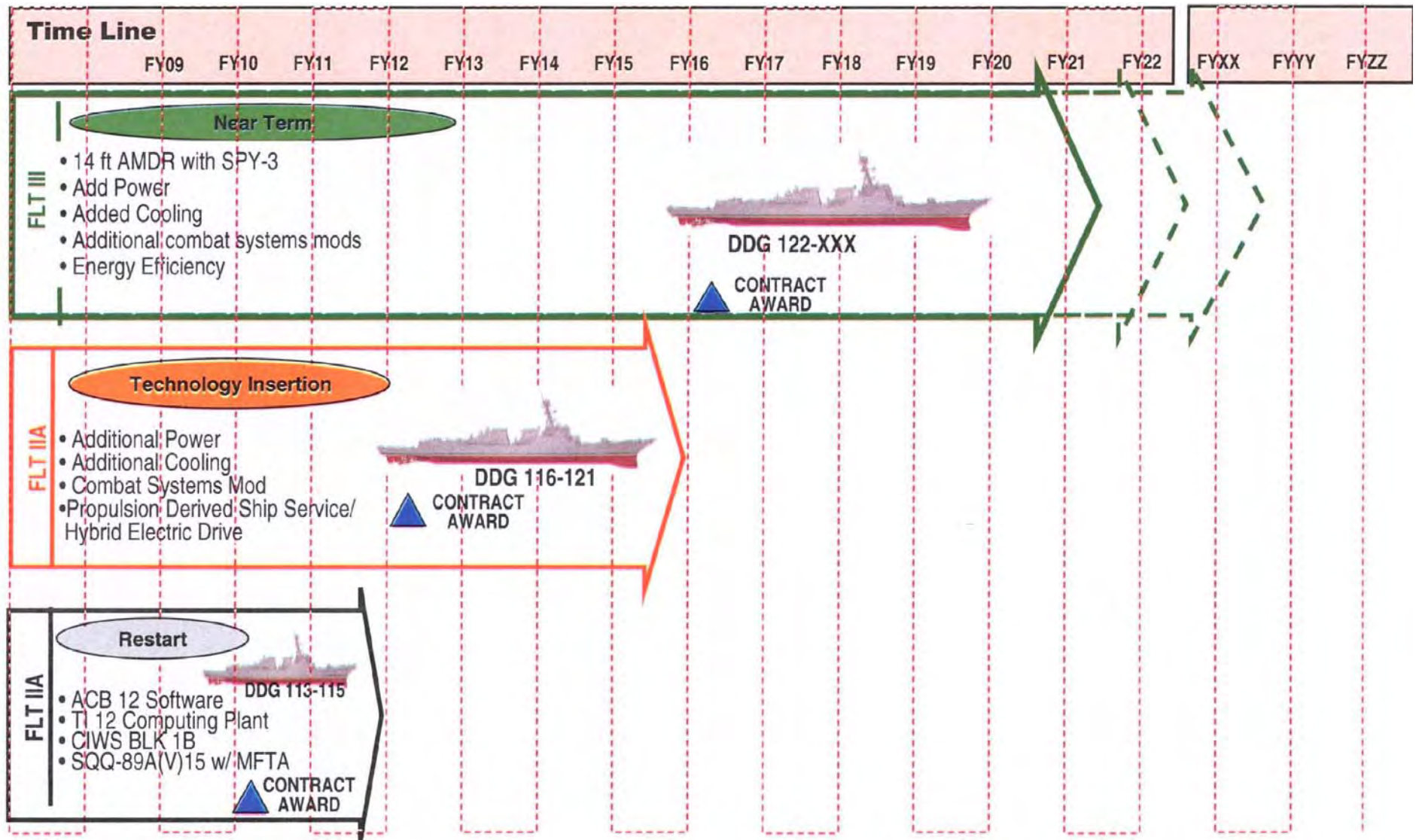
Air and Missile Defense Radar

- **Description**
 - The Air and Missile Defense Radar (AMDR) suite is being designed to support maritime Integrated Air and Missile Defense (IAMD)
 - AMDR is envisioned as a radar suite scalable to accommodate mission requirements for multiple ships
- **AMDR will consist of S-band (AMDR-S) and X-band (AMDR-X) radars and a Radar Suite Controller (RSC)**
 - AMDR-S- volume search, tracking, Ballistic Missile Defense (BMD) discrimination, and missile communications
 - AMDR-X- horizon search, precision tracking, missile communication and terminal illumination
 - RSC- interface between AMDR-S, AMDR-X, and combat system, and resource coordination
- **Program Status- proceeding to Milestone A**
 - AMDR Concept Studies- Completed
 - Three fixed-price concept development contracts
 - Each contractor developed conceptual design and technology maturation plans
 - AMDR-X RFI
 - Currently evaluating responses
 - AMDR-S/RSC Technology Development
 - Award anticipated Q4 FY10 (up to 3 Fixed Price Incentive contracts)
 - Focused on demonstrating AMDR key Technologies are scalable and sufficiently mature





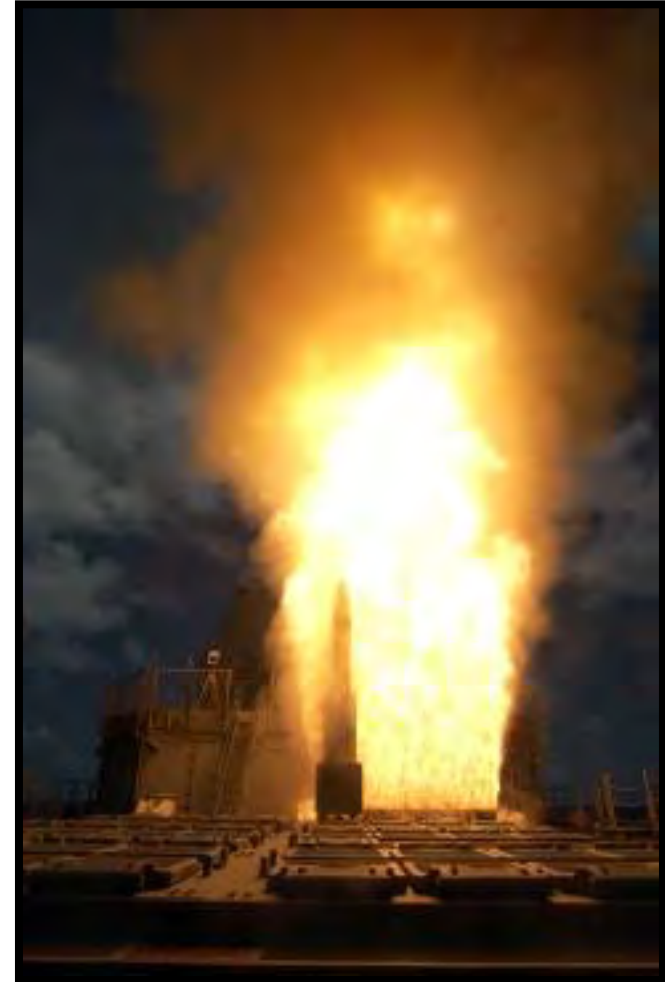
DDG Evolution





IAMD Summary

- **Operate**, maintain, and retain the legacy IAMD Fleet and Fleet Air Arm
- **Modernize** the IAMD Fleet of Multi-mission Surface Combatants and Tactical aircraft to pace the threat
- **Recapitalize** to remain relevant to the Joint IAMD Fight at Sea, Ashore, and Over Land





NATO
+
OTAN

ALTBMD

Dave Kiefer

ALTBMD Deputy Programme Manager

Dave.kiefer@tmd.nato.int



NATO UNCLASSIFIED

- **Who we are**
- **Where we are today**
- **Where we're headed**

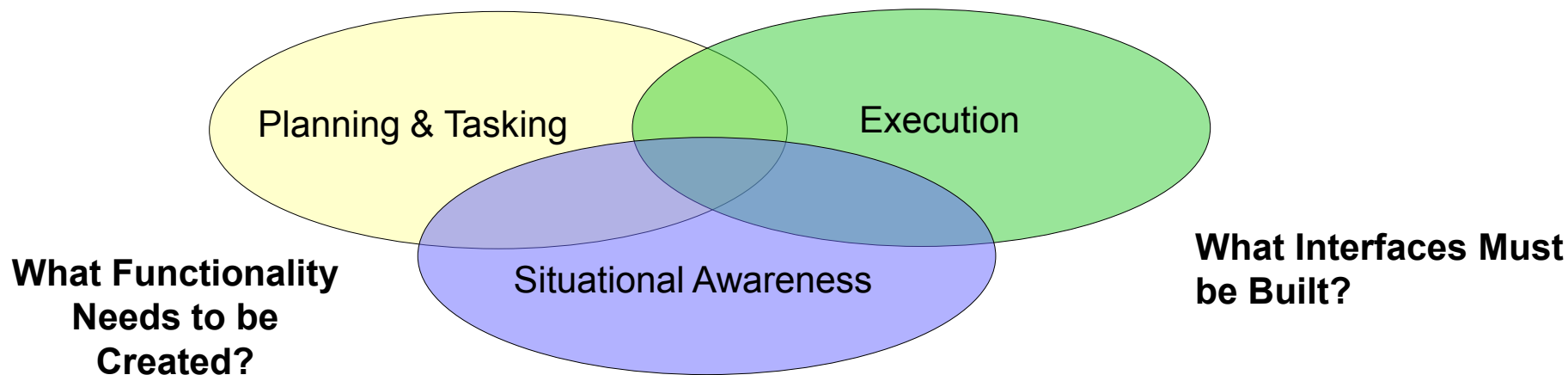
ALTBMD – Still our Mission



- A verified architecture providing the NATO Commander with the capability to “defend NATO forces, deployed either within or beyond NATO’s Area of Responsibility, against the threat posed by Tactical Ballistic Missiles (TBMs) with ranges up to 3,000 km.”

ALTBMD's Job

- **Modify NATO C2 systems to enable the NATO Commander to perform Missile Defence Missions**
 - **Modifications must fit into an overall NATO Command and Control System**
 - **Must Integrate national weapon systems assigned to NATO missions**
 - **Must Help the Commander perform his three primary functions**





Sensors

Spacebased



SBIRS & PTSS

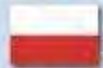
Landbased



M3R



AN/TPY-2



FADR/DADR



TPS 77

Seabased



Aegis BMD



Horizon



ADCF



F-105



F-124

Airborne



ABIRS

Shooters

Boost

Upper Layer

Lower Layer

Landbased



THAAD

Landbased



PATRIOT, MEADS



SAMP/T



PATRIOT



SAMP/T, MEADS



PATRIOT



PATRIOT



PATRIOT, MEADS

Seabased



Horizon/PAAMS



F-100

Command, Control & Communications

Strategic



BI-SC AIS



NGCS

Operational



BI-SC AIS



NGCS

Tactical



ACCS

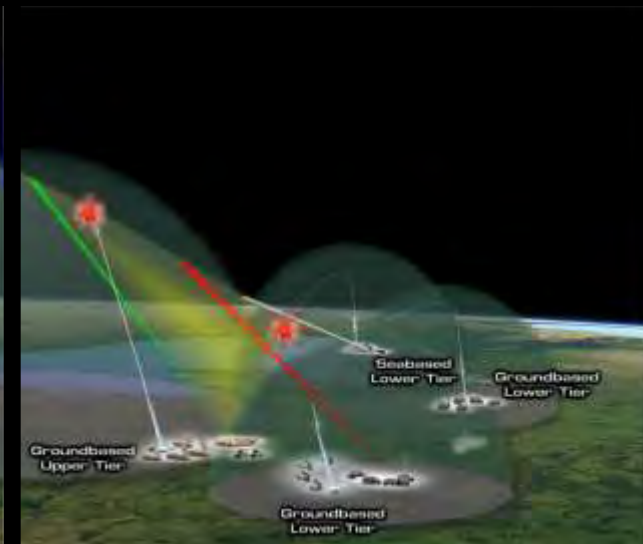
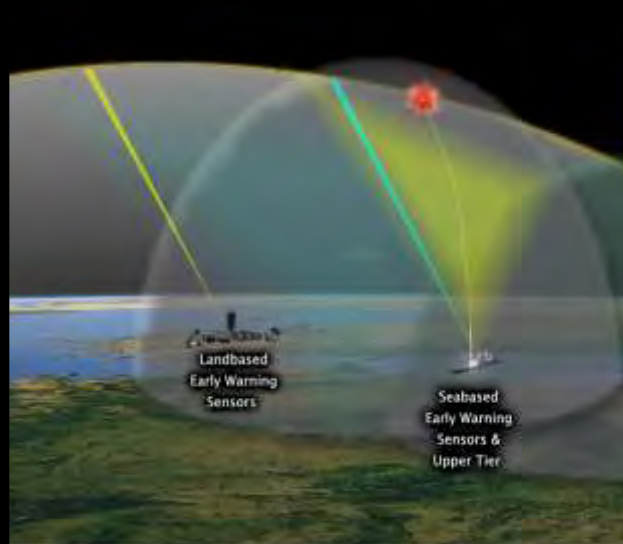
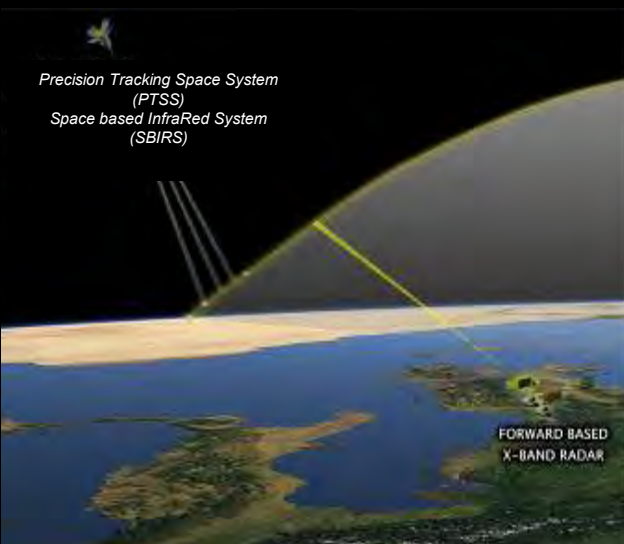
Legend:

BI-SC AIS - Bi-Strategic Command Automated Information System

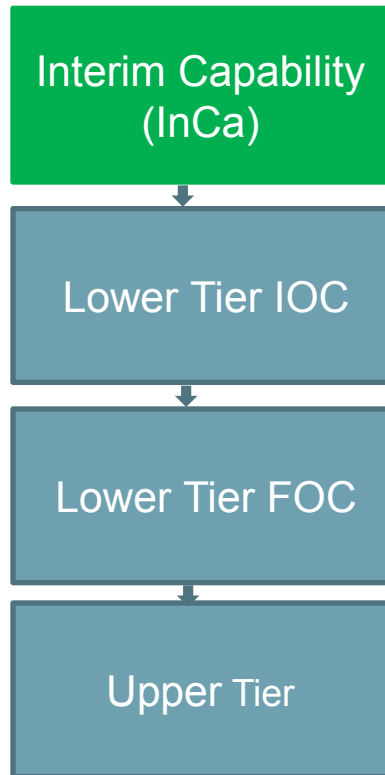
NGCS - NATO General Communications System

ACCS - Air Command & Control System

ALTBMD Reference Capability



ALTBMD Program Phases



Phase	Capability	Date
InCa 1	Basic TMD Planning and Tasking	Training Completed Operational Spring 2010
InCa 2	Integrated coherent planning with interface to national assets Based on ALTBM ACCS Real Time Prototype	December 2010.
Lower Layer IOC	Planned: Initial lower layer systems Current: Two steps to IOC 2013 and 2014	2014
Lower Layer FOC	Additional lower layer systems, implement in the static NATO Command Structure	2016
Upper Layer	Incorporation of upper layer systems	2018

- Who we are
- Where we are today
- Where we're headed

Interim Capability (InCa)



- **After the announcement of a delay of a component of the ALTBMD programme in fall 2008, the NATO Military Authorities defined the Minimum Military Requirements for an Interim Capability for the NATO TBMD mission in 2010 to:**
 - Provide planning and tasking capability
 - Provide situational awareness
- **The Interim Capability has been developed and is fielded**

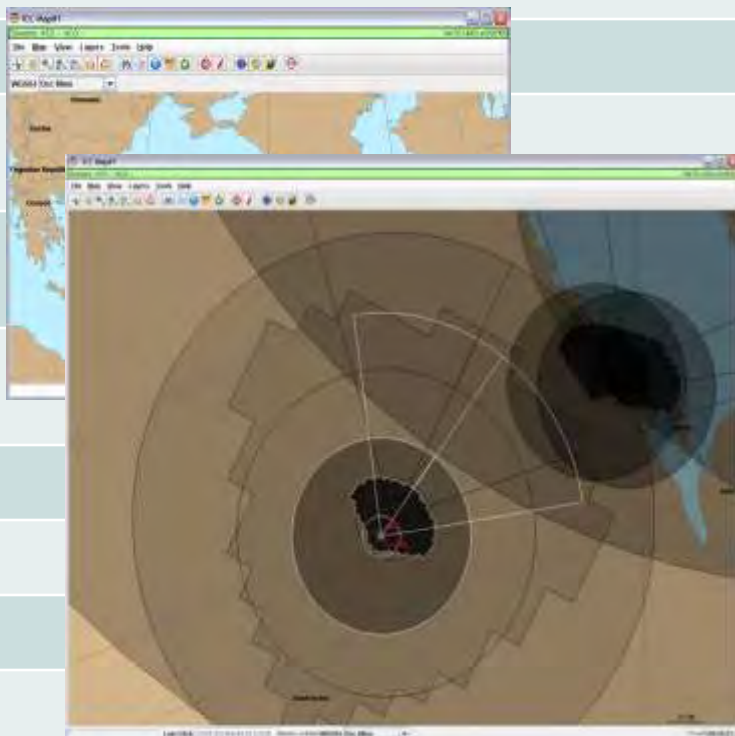
**Three NATO Prototypes make the Interim Capability Possible:
ACCS Prototype 1C, PlaTo and DEPT**

Fielding Capability (December 2010)

Interim Capability 1:

TBMD planning tools:

- Delivered: 2009
- Validated and accepted: May 2010



Interim Capability 2:

TBMD planning tools:

- Enhanced planning capability

TBMD situational awareness:

- Deploying truck mounted situational awareness tool
- Elements yested in JPOW 2010
- Tested with multiple national systems in early December'10
- Delivery December 2010 // operational validation expected later in 2011



InCa 2 Real Time ALTBMD InCa Van



Delivered to operational users

Ensemble Test - December 2010

Final Risk Reduction for InCa

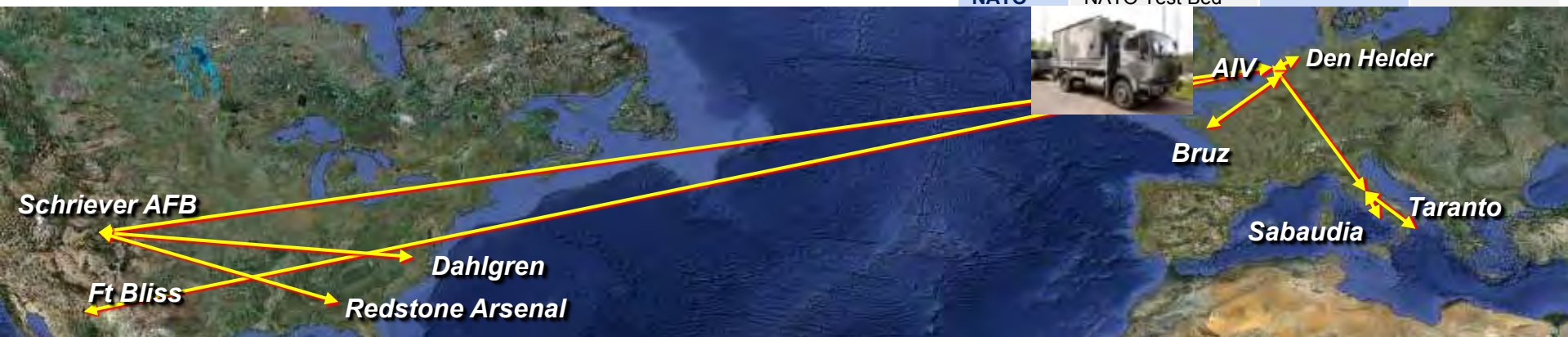
Objectives:

- Technical verification of the InCa 2 RT components with National systems
- Operationally assess InCa

Outcome

- Technical Verification Successful
- SHAPE:
Operationally viable. Approved for deployment to Uedem

Participants			
DEU PATRIOT	El Paso, Texas (FMSD/PACTOS)	NLD ADCF/EW	Den Helder, Netherlands
DEU SAMOC	El Paso (Also a viewer in the ITB)	NLD PATRIOT	AFB De Peel, Netherlands
FRA SAMP/T	Bruz, France	USA Aegis BMD	Dahlgren, Maryland
ITA Horizon/PAAMS	Taranto, Italy	USA C2BMC - TPY2	Colorado Springs (Also a viewer in the ITB)
ITA SAMP/T	Sabaudia, Italy	USA PATRIOT	Huntsville, Alabama
NATO AIV	NATO The Hague	USA Shared Early Warning	Colorado Springs (Including Peterson AFB)
NATO	NATO Test Bed -		





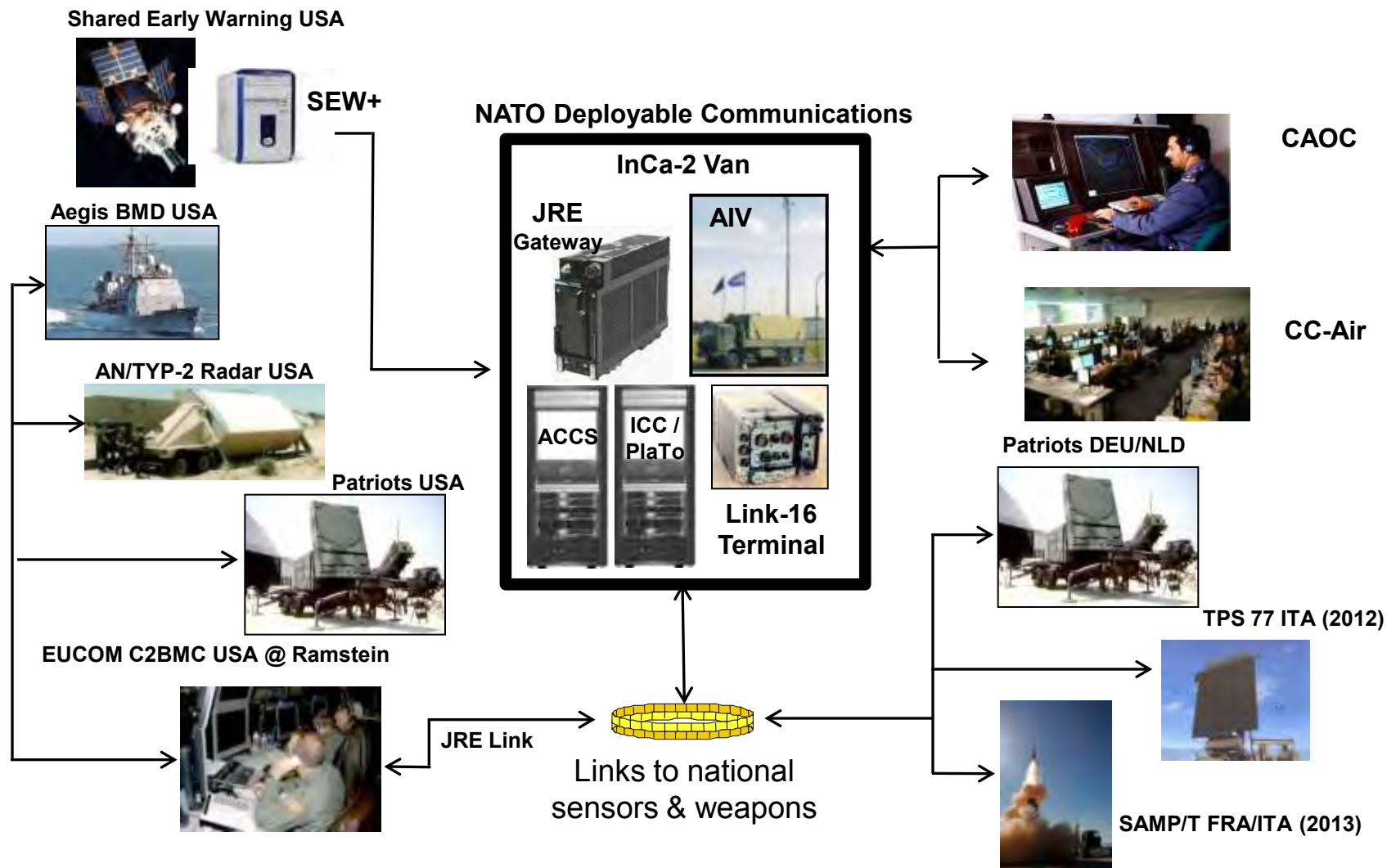
BMD Interim Capability Spring 2012 to IOC (2014)

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InCa Operational Acceptance

- Planning

**Operational Validation during
Exercise Steadfast Juncture 2011
05 – 12 NOV 2011**

- Situational Awareness



**Operational Assessment during
Ensemble Test 1
09 DEC – 10 DEC 2010**

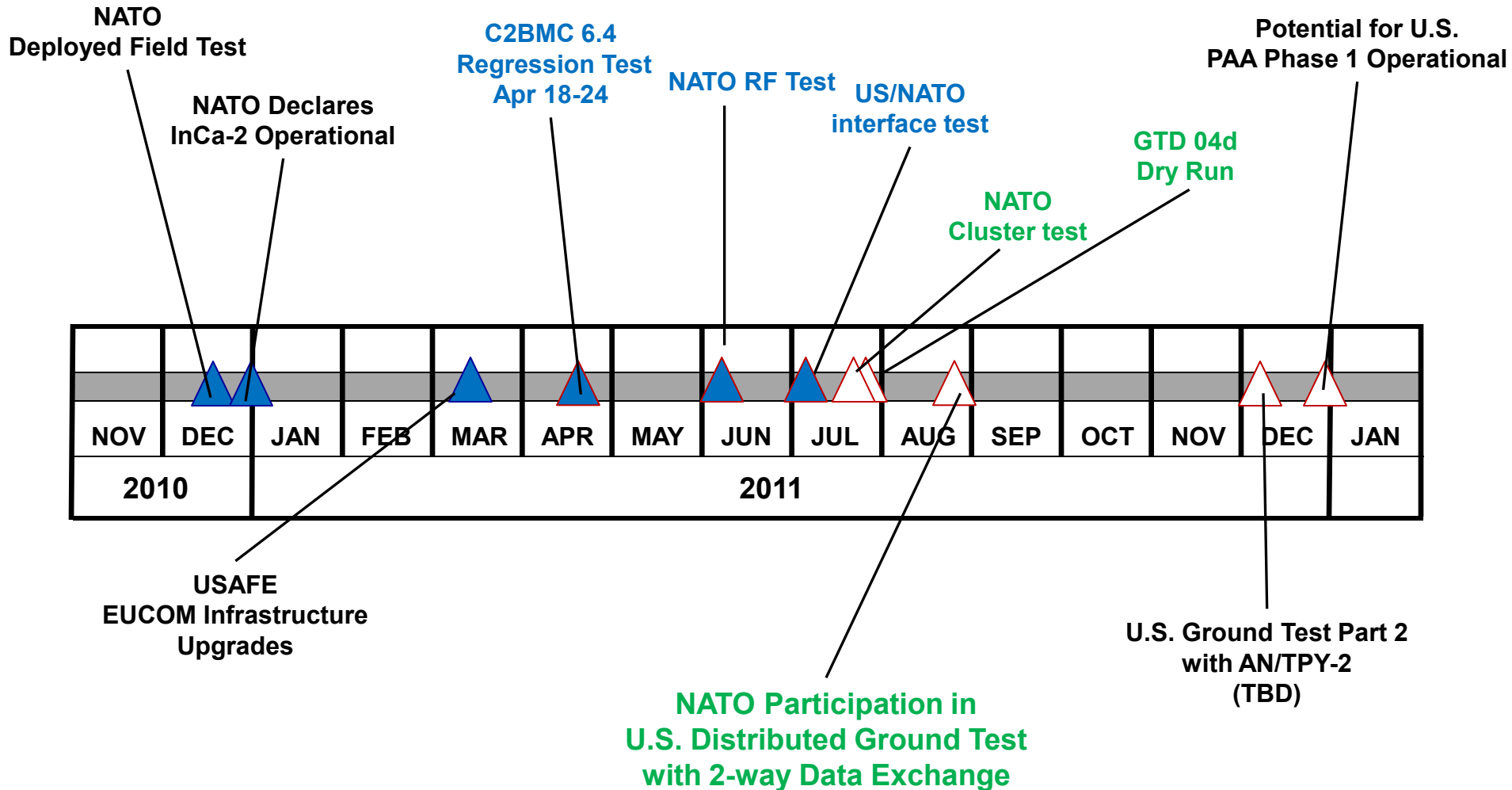
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Upcoming {

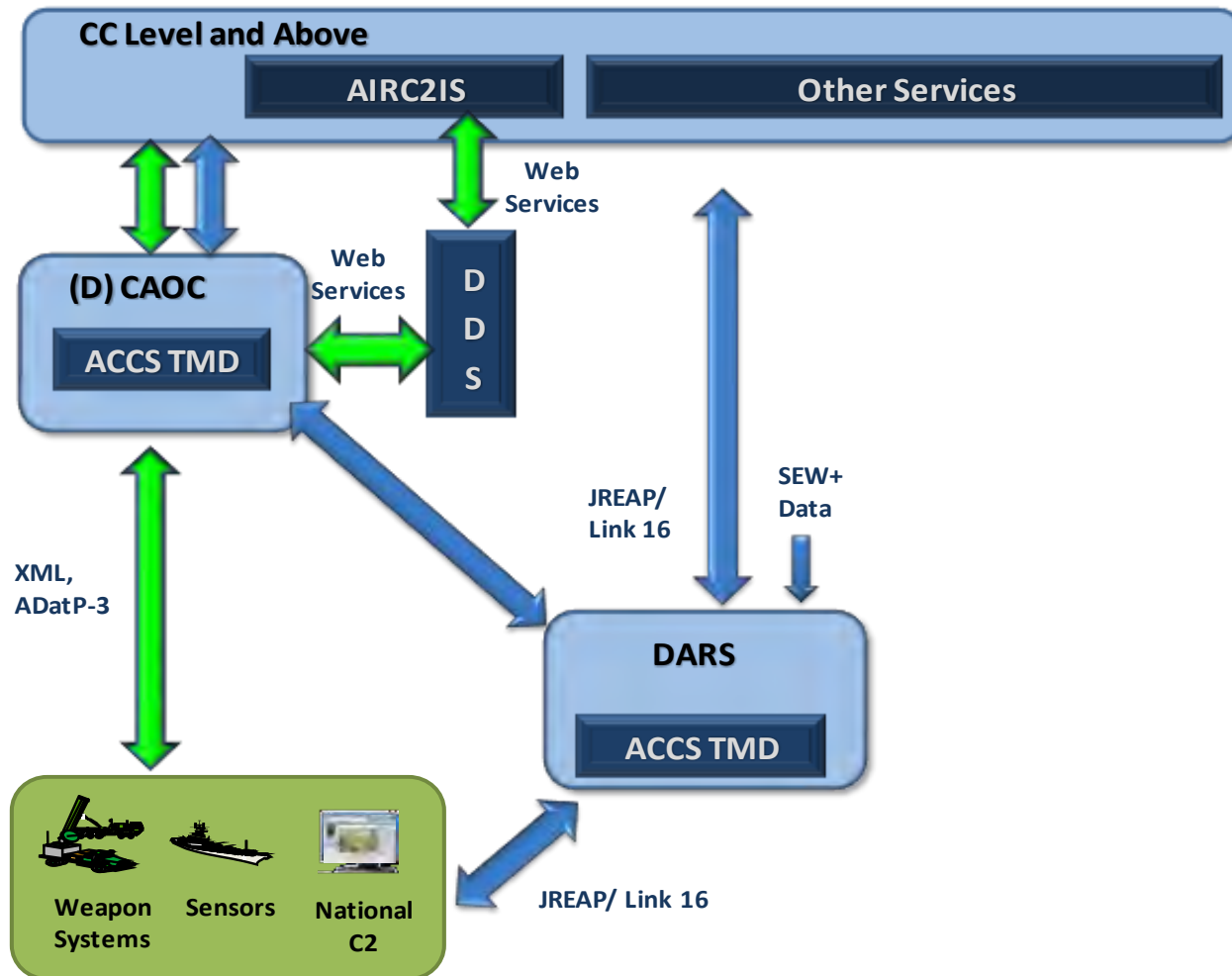
- Operational Validation during
USA European Phased Adaptive Approach Ground Test
GTD-04d**
- Operational Validation during
DEU Tactical Firing on CRETE/GRC**



Test Of this Capability – GTD-04d



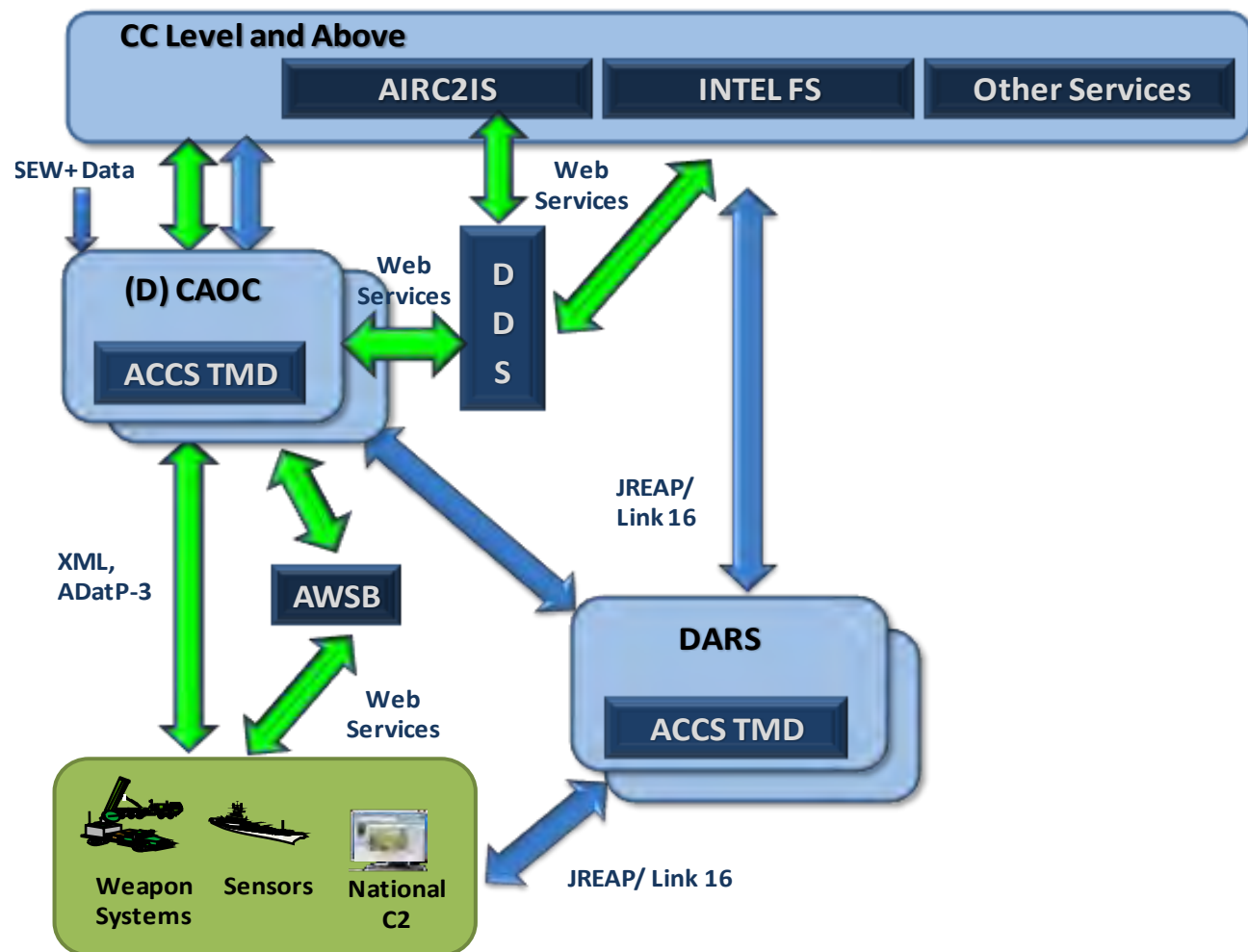
Initial Operational Capability (IOC)



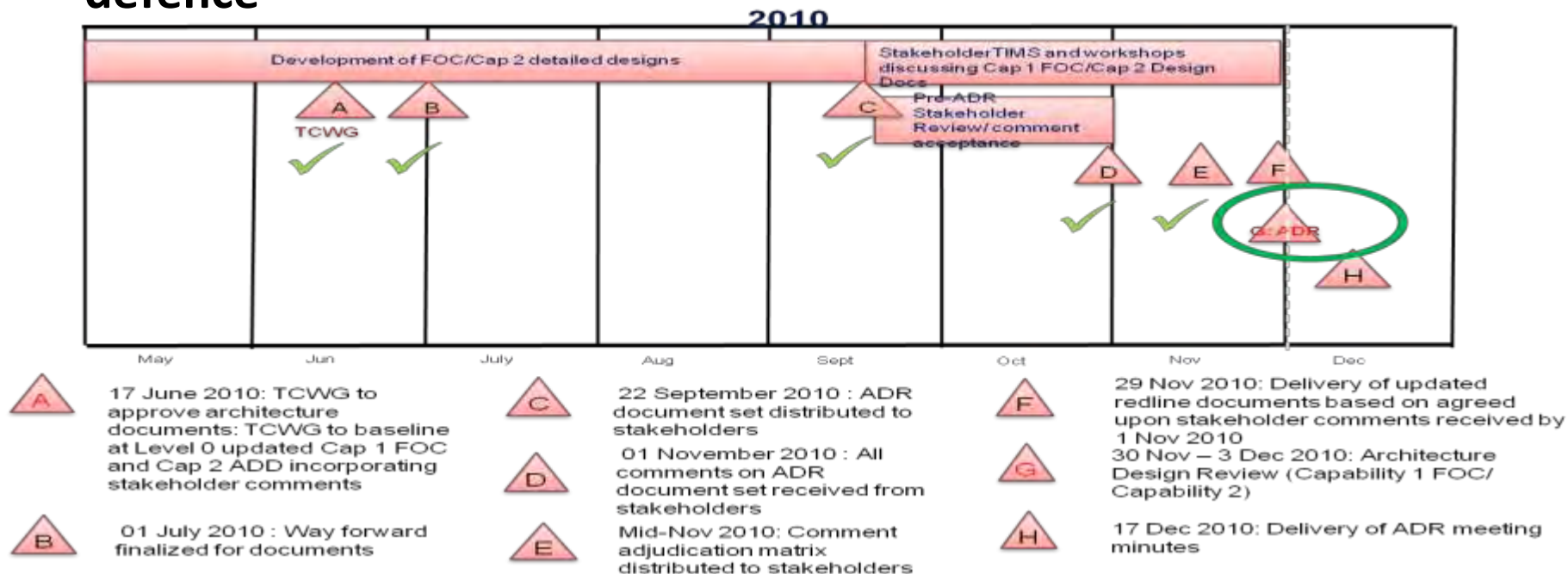
- **ACCS TMD1 – To be procured in 3 steps**
 - Preliminary System Definition (PSD) – Contract Signed 31 Jan 2011
 - TMD1 Increment 1 verified Q3 2013
 - TMD1 Increment 2 verified Q4 2014 – Completes full IOC functionality
- **Bi-SC AIS TMD1**
 - Air C2IS Increment 1 – Contracted
 - Supporting Projects for Capability 1: TOPFAS, NCOP
- **NGCS TMD1** : Project to be implemented through 10 independent Work Packages
 - Two Work Packages partially implemented with InCa 2 (Static Information Exchange Gateway - IEG, InfoSec)

IOC Implementation phase has started

Final Architecture



- Initial architecture defined in 2010
- Documentation updates to be completed in 2011
- Cap 1-FOC and Cap2 architecture will be the basis for the expansion of ALTBMD to a capability for territorial missile defence



- **Who we are**
- **Where we are today**
- **Where we're headed**

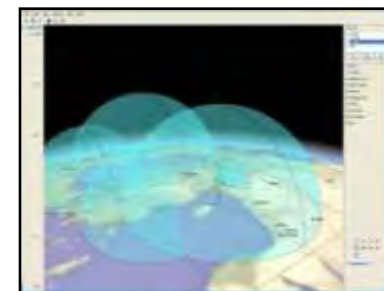
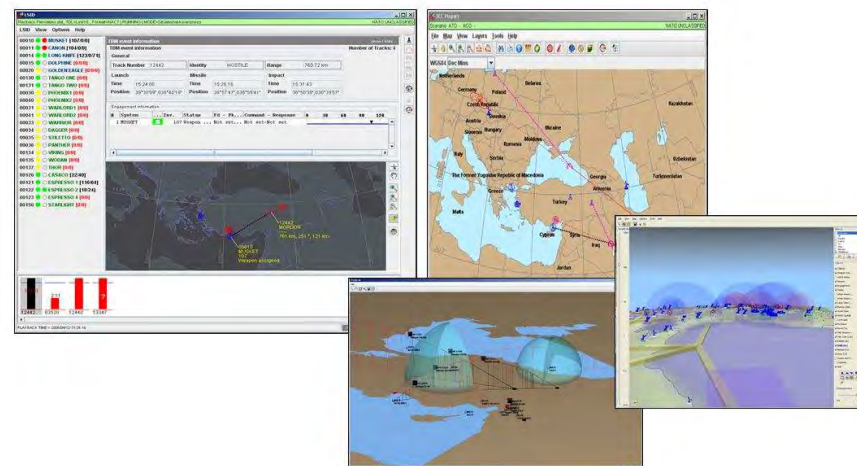
•Lisbon Summit, November 2010 Communiqué:

The threat to NATO European populations, territory and forces posed by the proliferation of ballistic missiles is increasing. As missile defence forms part of a broader response to counter this threat, we have decided that the Alliance will develop a missile defence capability to pursue its core task of collective defence....

To this end, we have decided that the scope of NATO's current Active Layered Theatre Ballistic Missile Defence (ALTBMD) programme's command, control and communications capabilities will be expanded beyond the protection of NATO deployed forces to also protect NATO European populations, territory and forces.

**Conference of National Armaments Directors:
“Expansion of ALT BMD Programme for
NATO territorial missile defence is feasible
and has been recognized as the most
effective way to achieve this capability.”**

- In response to Approved Summit Task,
 - Identify NATO territorial BMD requirements including new functions for:
 - Enhanced situational awareness
 - Consultation
 - Enhanced Coordination / collaborative planning
 - Engagement coordination
 - Consequence mitigation
 - Review the ALTBMMD NATO Staff Requirement
 - Document additional requirements or modifications to ALTBMMD NSR

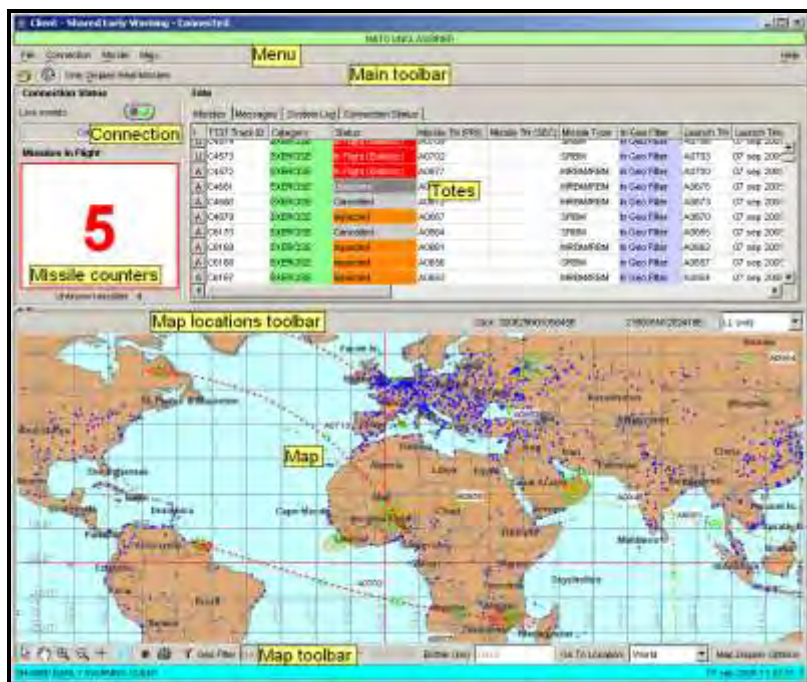


Missile Defence Consultation

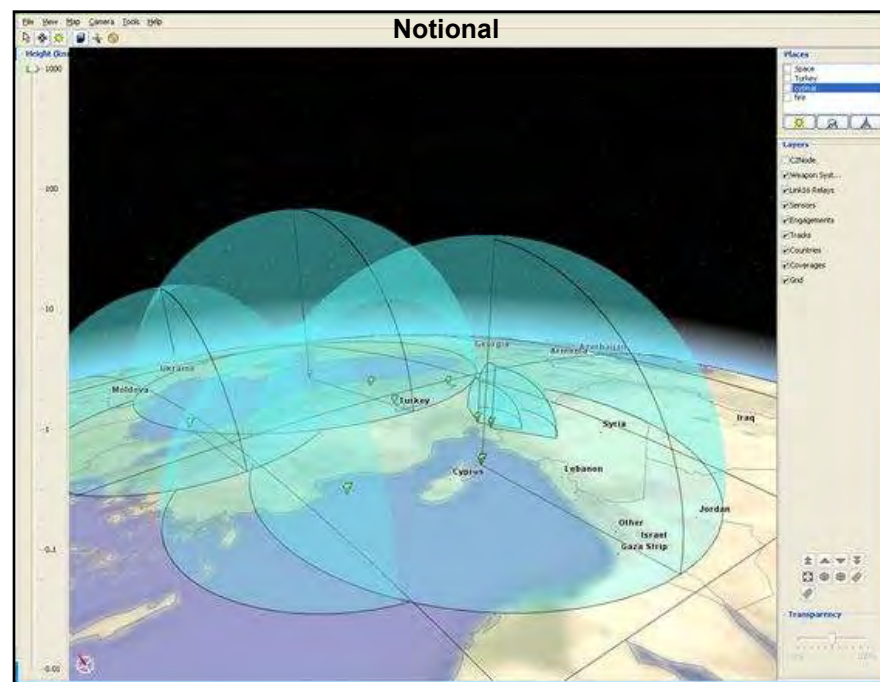
- Support to political/diplomatic/legal efforts
- Consensus building
- Options for military responses – risk analysis
- Pre-authorisation and conditions of BM engagements to meet stressing timelines
- Communicating NATO intentions
 - To potential opponents, third parties
- Potential impact of debris in other NATO or neutral nations
- Guidance for planning operations
 - Authorisation of plans
- High Level Situation Awareness



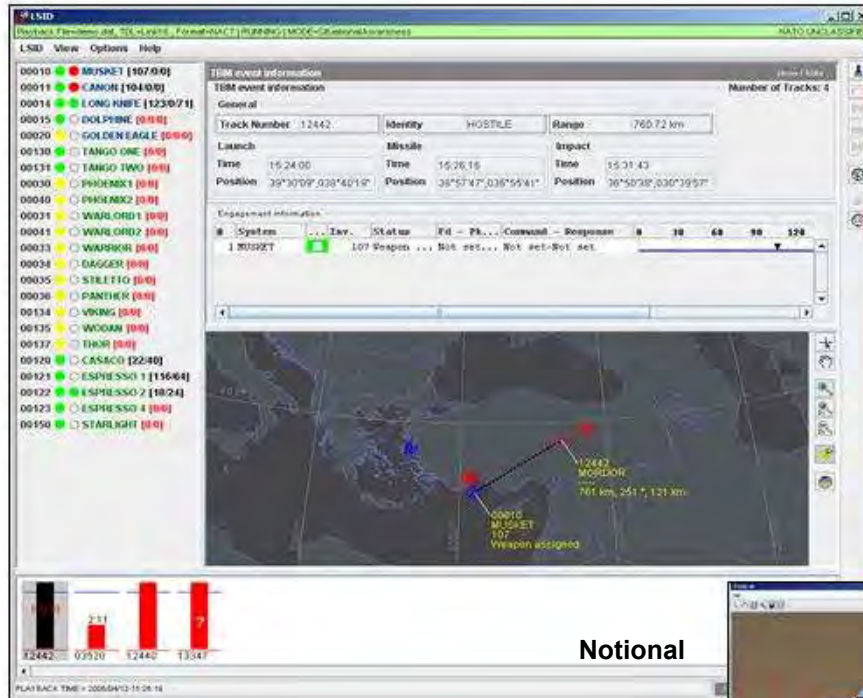
- **Display events to pol-mil decision-makers**
 - Displays of recent and current missile events
 - Support to strategic planning, prioritisation, option/risk assessments
 - Provide Information to NATO Capitols



(NATO Shared Early Warning Client)



Engagement Coordination and Monitoring

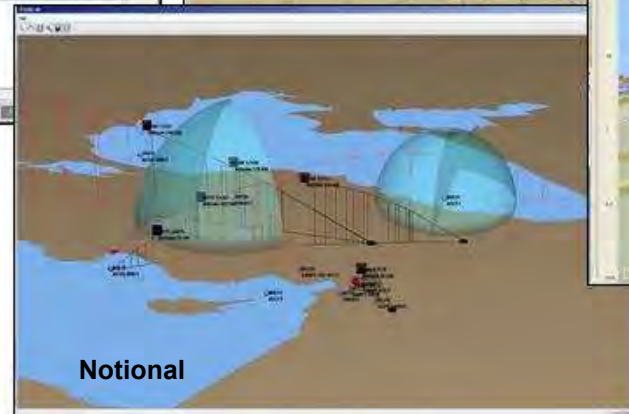


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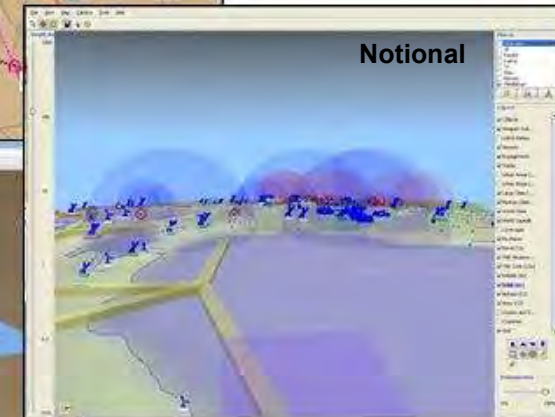


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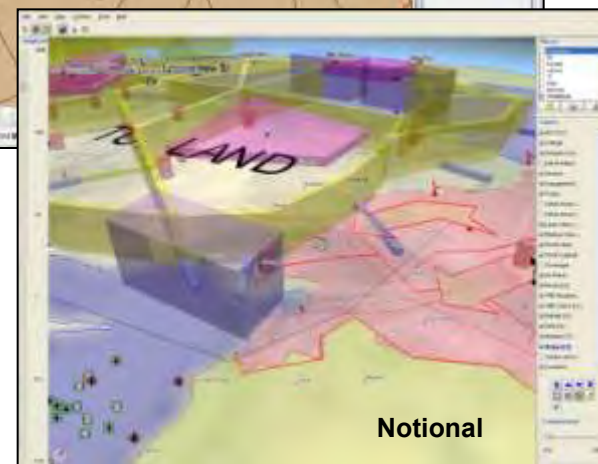
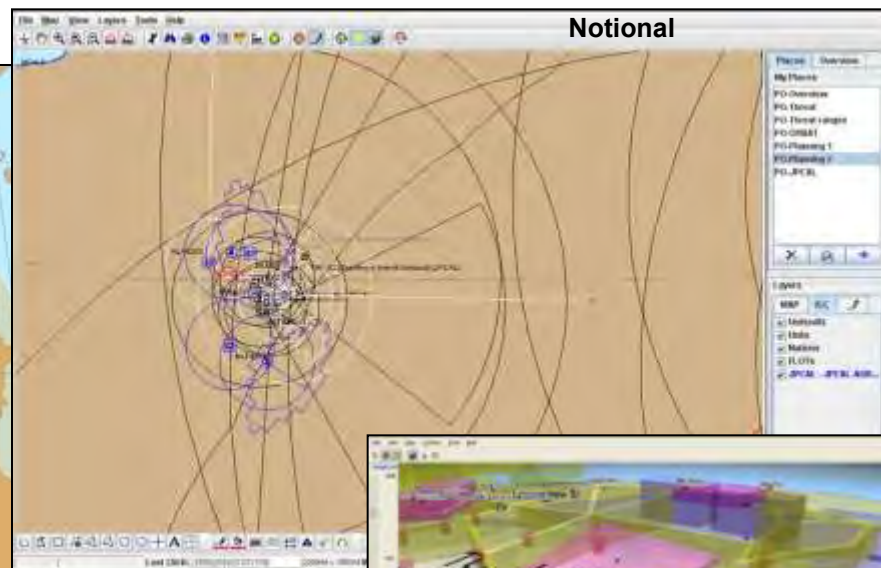
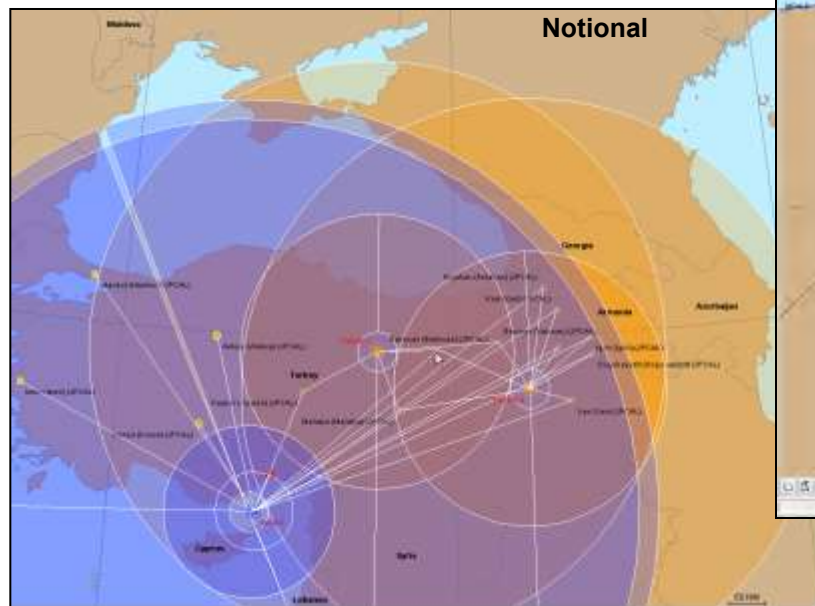
- Integrated Air and Missile Defence Real-time Picture throughout NATO C2
- Provide Battle Management Tools



Notional



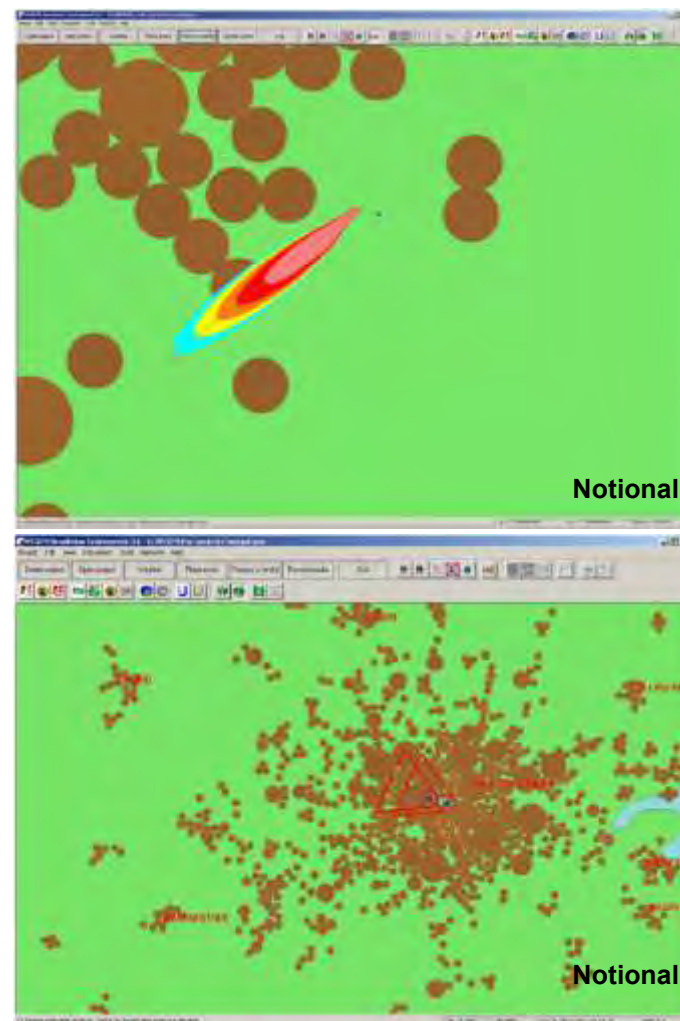
Defence Design and Engagement Planning



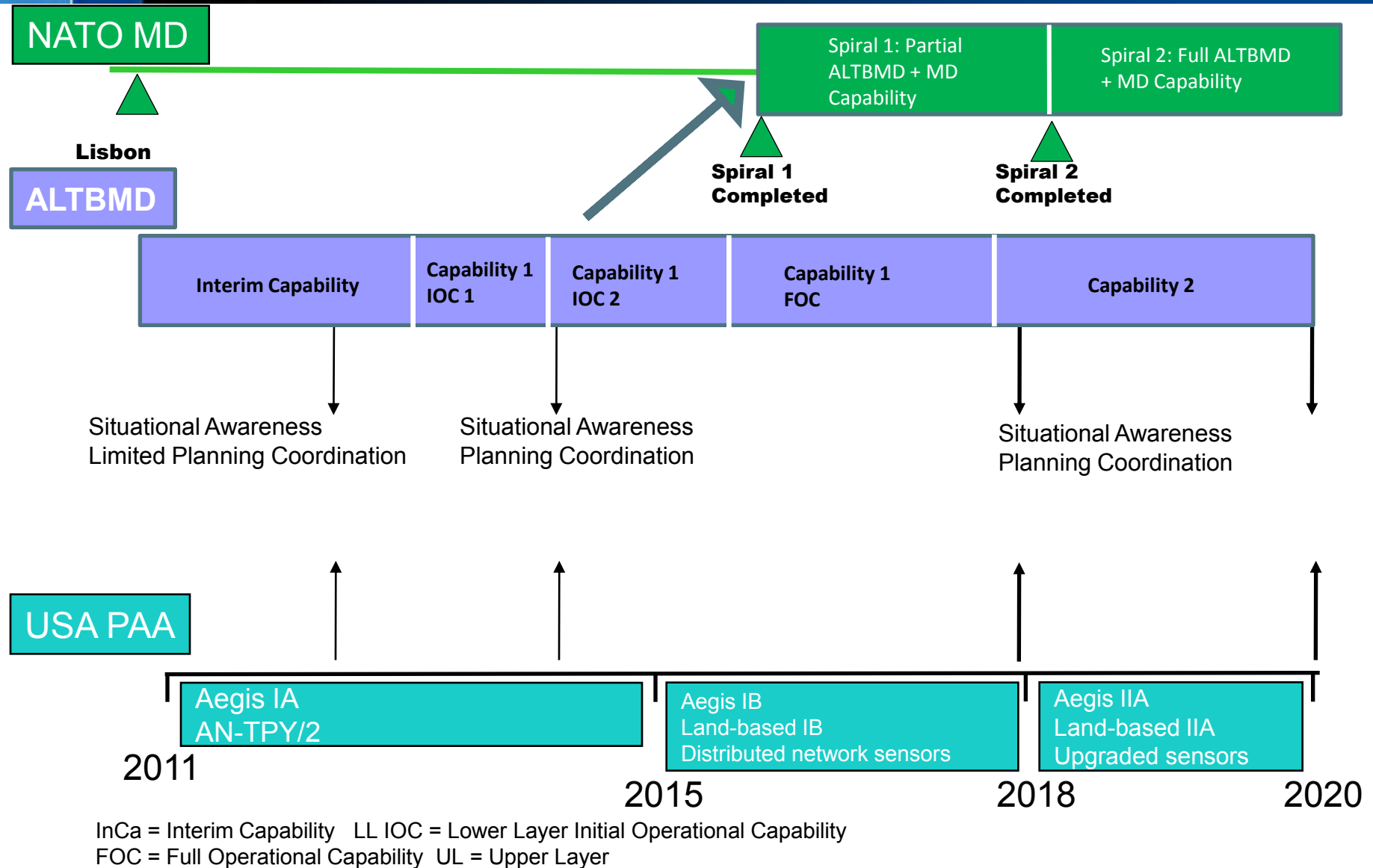
- Optimise the use of offensive and defensive assets to provide effective Missile Defence
- Integrated Air and Missile Defence Planning

Predictive COI Analysis Post-Engagement COI Analysis COI Warning Dissemination

- Support Passive Defence operations
- Provide INTEL with Enemy WMD & COA Updates
- Civil Emergency Planning and Response
- Provides Ground Hazard Predictions and Actual Information



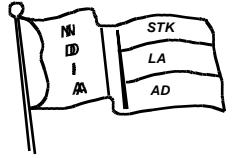
Alignment of NATO MD with USA PAA



ALTBM Programme has now delivered an Interim Capability to support NATO Air Command and Control Operations

- **Lower Layer IOC has entered implementation stage**
- **Extensive testing of the combined US/NATO interim operational capability is underway and, if successful, will validate a first operational capability that could be used for territorial defence based on USA EPAA and NATO InCa**
- **Expansion of ALTBM Programme for NATO territorial missile defence is feasible, has been recognized as the most effective way to achieve this capability and will begin this year with a re-evaluation of the architecture level requirements.**





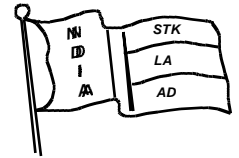
WELCOME ABOARD !

**STRIKE, LAND ATTACK, & AIR DEFENSE DIVISION
AND
MISSILE DEFENSE DIVISION
*ANNUAL SYMPOSIUM***

***THE STATE OF INTEGRATED AIR AND
MISSILE DEFENSE (IAMD)***

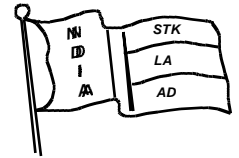
14 July 2011

**JOHN REILLY
CHAIRMAN, SLAAD**



2ND YEAR of TEAMED SYMPOSIUM

- **2ND ANNUAL “STATE OF INTEGRATED AIR AND MISSILE DEFENSE (IAMD)” SYMPOSIUM**
 - SECOND, FOLLOW-ON TEAMED SYMPOSIUM EFFORT BY THE NDIA SLAA AND MISSILE DEFENSE DIVISIONS
 - SUSTAINS A NEW VENUE IN NDIA FOR AN ANNUAL SYMPOSIUM FOCUSING ON THE LATEST STATUS OF KEY JOINT AND SERVICE PROGRAMS AND TECHNOLOGIES CONCERNED WITH INTEGRATED AIR AND MISSILE DEFENSE (IAMD)
- **OUR SYMPOSIUM VISION:**
 - ANNUAL --- IN 2012, OUR 3RD ANNUAL IAMD SYMPOSIUM!
 - VENUE: KOSSIAKOFF CONFERENCE CENTER, JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY, LAUREL, MD
 - CLASSIFICATION LEVEL ~ SECRET
 - NO PRESS / MEDIA --- SPEAKERS MAY SPEAK CANDIDLY
 - NON-ATTRIBUTION



STRIKE, LAND ATTACK, AND AIR DEFENSE DIVISION

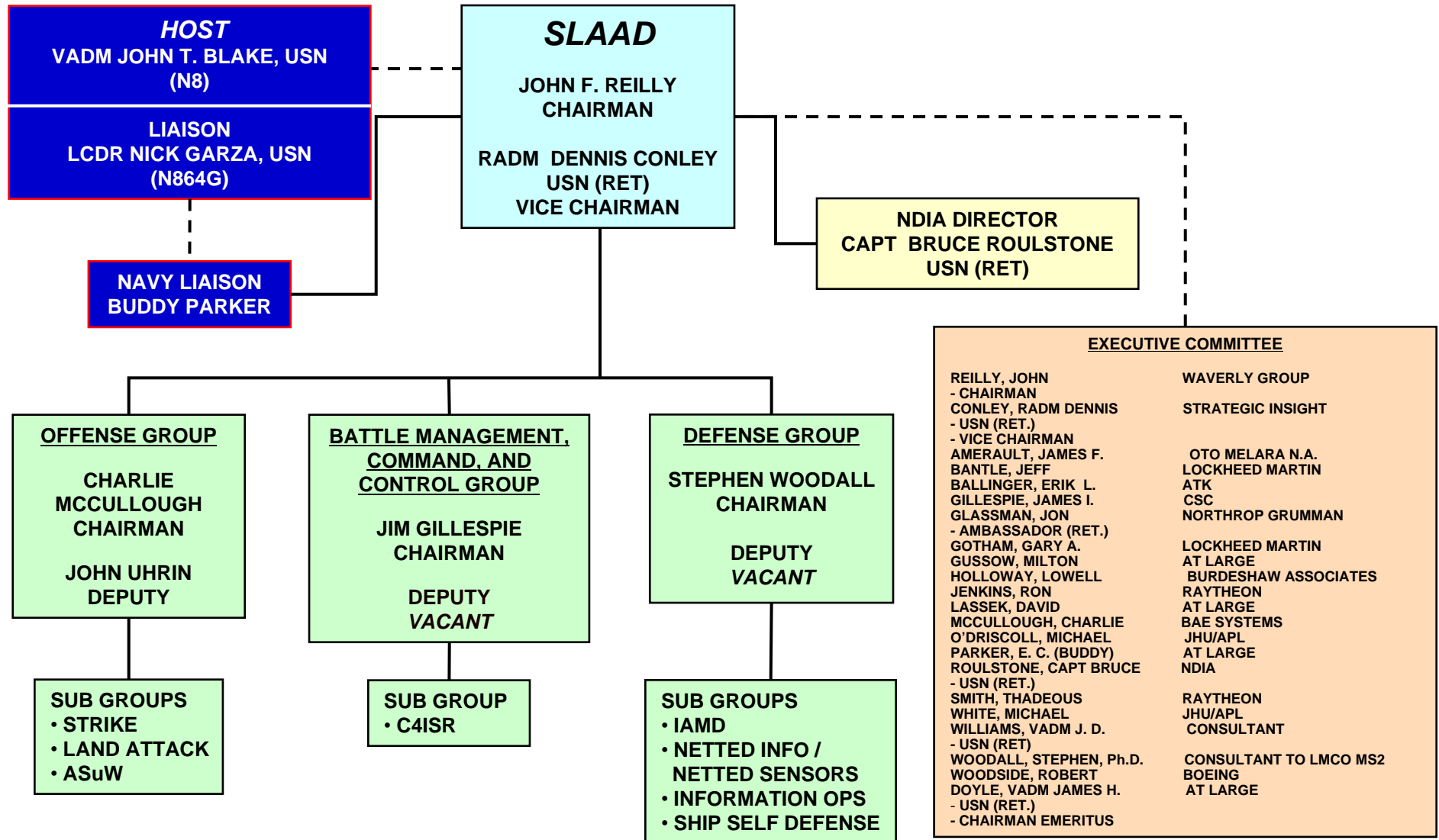
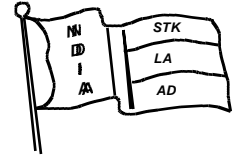
- **MISSION AND PURPOSE**
 - PROVIDE OPEN AND OBJECTIVE COMMUNICATION CHANNEL AMONG U.S. NAVY, DEPARTMENT OF DEFENSE, AND INDUSTRY
 - ADDRESS THREAT, OPERATIONAL CONCEPTS, COMBAT ARCHITECTURES, SYSTEM TECHNOLOGY, SYSTEMS INTEGRATION, ACQUISITION, AND MANPOWER ISSUES
- **FOCUS**
 - CONDUCT FORMAL STUDIES AND ANALYSES RELATED TO STRIKE, LAND ATTACK, AND AIR DEFENSE ISSUES
 - PREPARE AND DISTRIBUTE STUDY REPORTS TO GOVERNMENT AND INDUSTRY
 - SCOPE THE STUDIES TO PROVIDE UNBIASED, USEFUL AND TIMELY RESULTS
 - STUDY PARTICIPATION BY INDUSTRY AND GOVERNMENT IS VOLUNTARY
- ***SINCE 1982, SLAAD HAS PERFORMED OVER 100 PRO BONO STUDIES FOR THE DEPARTMENT OF THE NAVY***

NDIA

**Strike, Land Attack, and
Air Defense Division**



STRIKE, LAND ATTACK, AND AIR DEFENSE DIVISION





Joint Air and Missile Defense Community of Interest (JAMD COI) Net-Centric Migration Activities

Joint Air and Missile Defense Community of Interest (JAMD COI)

“The Hub of Net-Centric Migration Activities for Joint IAMD”

Co-Directors



Ole Knudson
BG, USA
Program Executive Officer,
Missiles and Space (PEO MS)

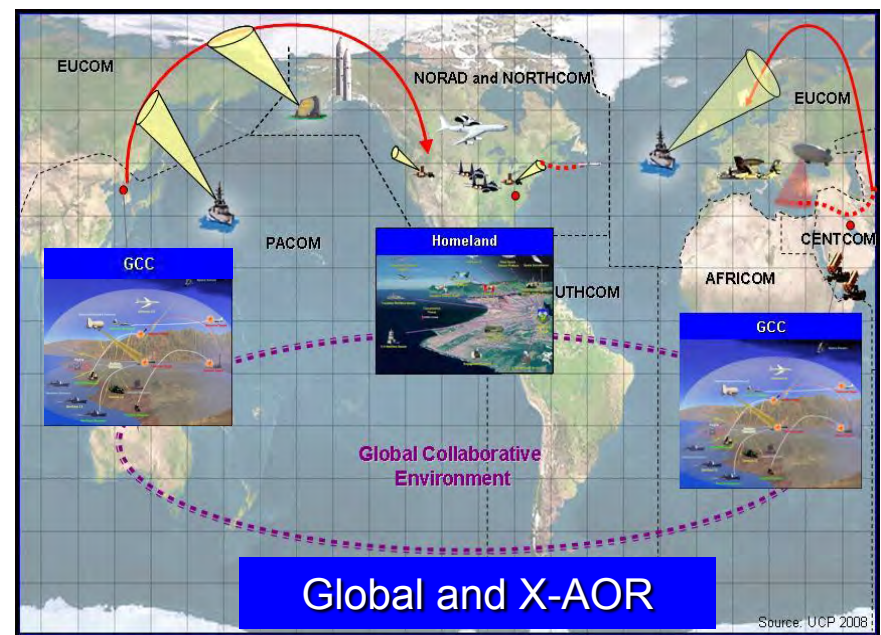
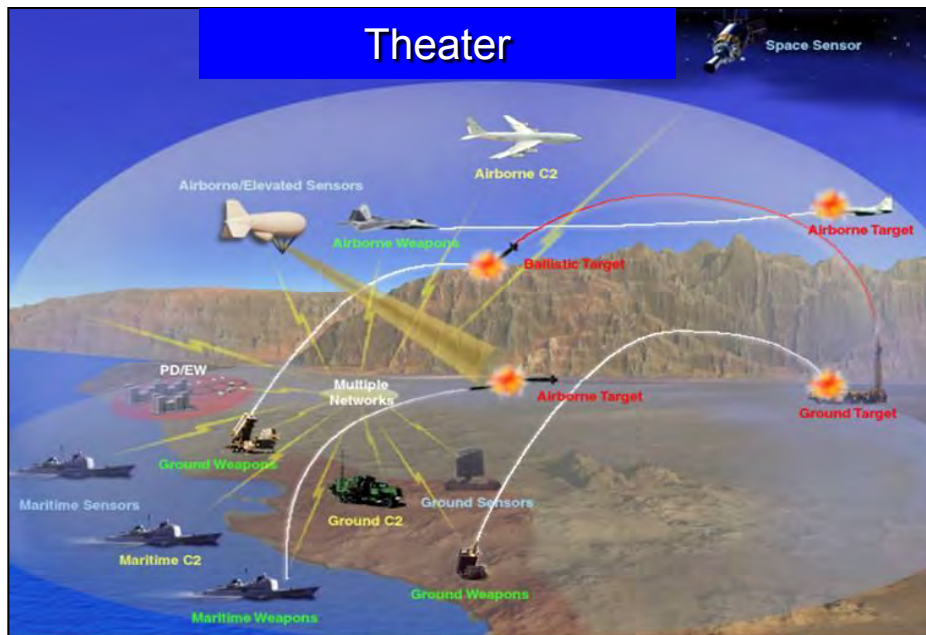


Kerry Kelley
Senior Executive Service (SES)
J6
USSTRATCOM

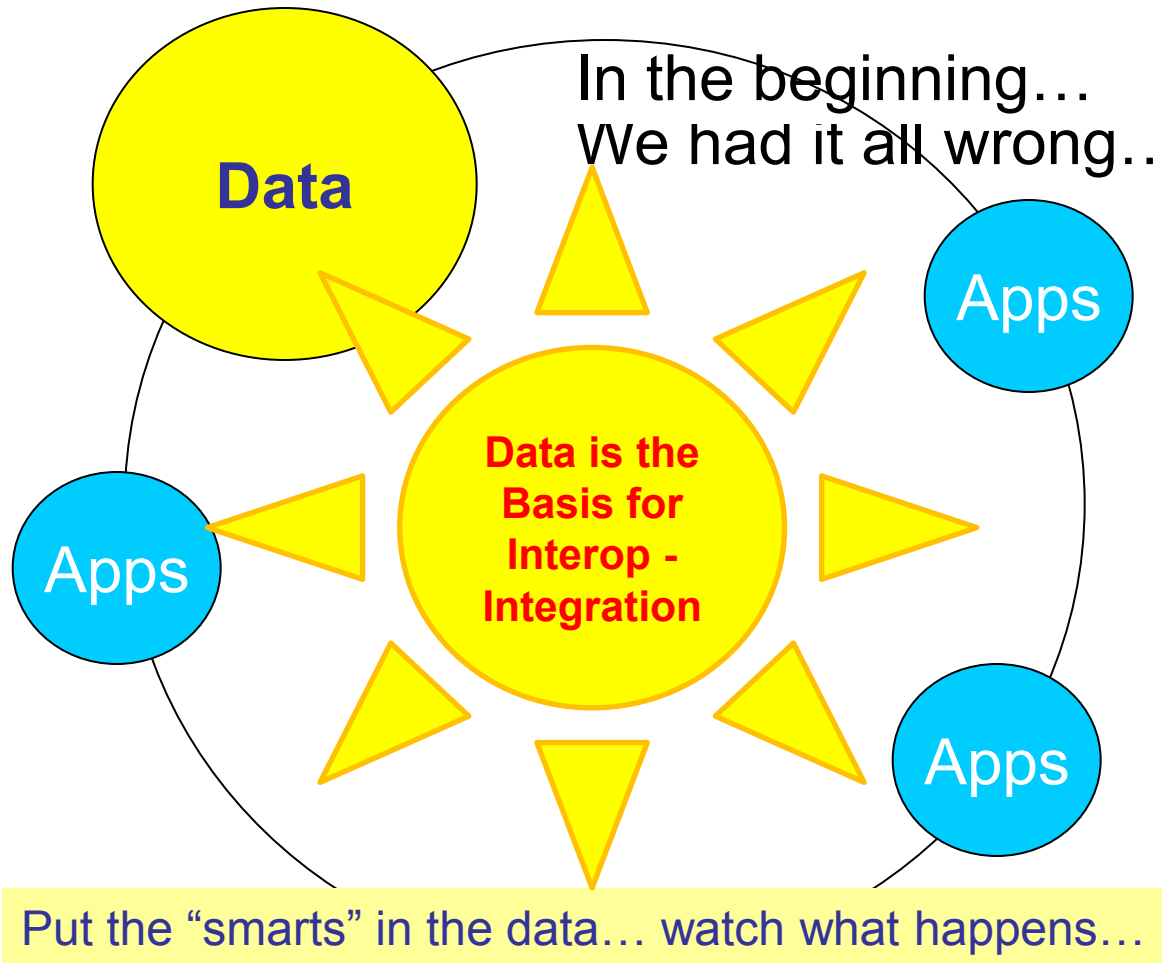
Distribution Statement A – Cleared for Public Release

Joint Air and Missile Defense Community of Interest Mission

- Support migration of the Joint and Multinational IAMD communities toward Net-Centric Operations and Warfare through *the development of a single common data standard/ vocabulary for the JIAMD community as well as other JIAMD Net-Centric Products*
- Establish a strategy for programs within the JAMD COI portfolio to *actively address the Net-Ready KPP* and to *support the PMs with Net-Centric expertise and artifacts/tools*
- Establish a framework that *supports PMs in leveraging DoD and industry technologies* to bring services-oriented architecture (SOA) capabilities to the Joint IAMD Warfighter (i.e., web technologies)

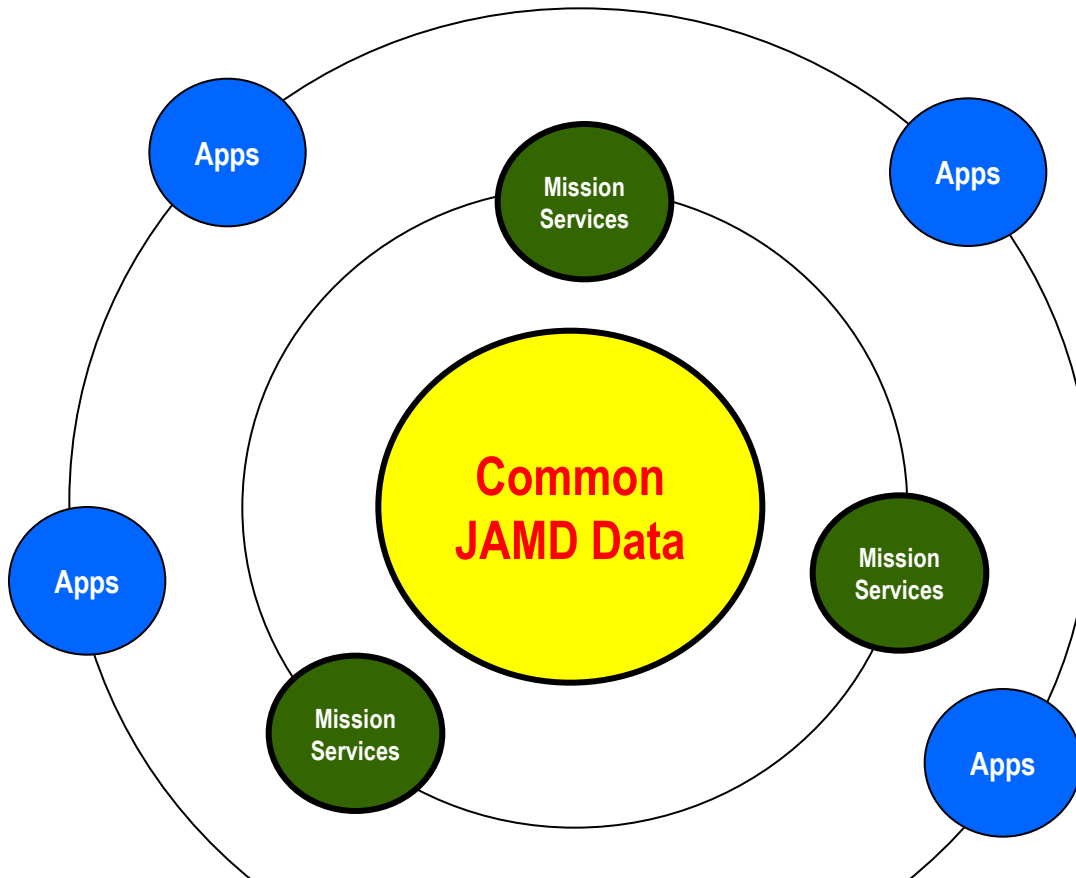


“Copernican Shift” in Interoperability - Integration



***“It’s the data, stupid! Break down the vertical cylinders of excellence.”
-Gen. Cartwright, JIAMD Summit-07***

The Role of Common Data / Mission Services



The Service-Oriented Architecture (SOA) component of the Net-Centric Data Strategy Requires...

...Building Applications that leverage common Mission Services built on common data!

Develop Mission Services Based on Common Data...

Break Down the Stove Pipe CPs, Dedicated Radios and Networks... Mission Services Available to All Authorized Users.



Key Components of the DOD Net-Centric Data Strategy

Department of Defense
Chief Information Officer

Make Data Visible

Is an information resource **discoverable** by **end-users**?

Make Data Accessible

Is it connected to the network(s), and are tools readily available to use and allow assured access to it?

Make Data Understandable

Can it be used intelligibly? Are the **semantics well documented**?

Make Data Governable

Are **data processes governed** with **sustained leadership**?

Enable Data to Be Trusted

Is the **authority** (pedigree, security level, and access control level) **known** and available?

Make Data Interoperable

Can it be easily combined or compared with other information and/or mediated?

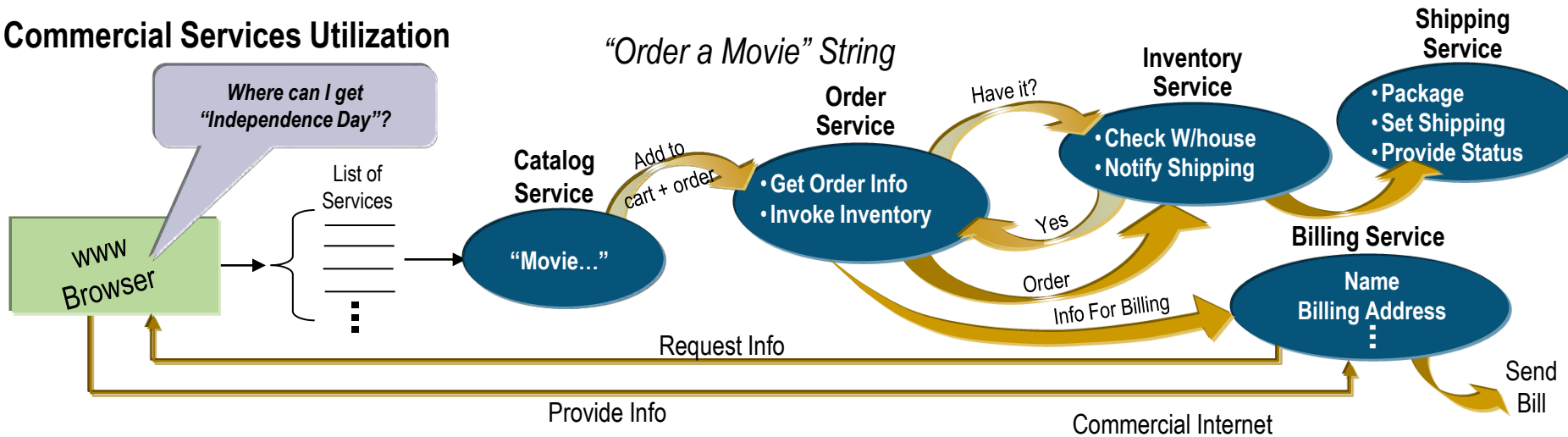
Be Responsive to User Needs

Are users involved in COIs? Are robust, direct user feedback mechanisms in place to guide development?

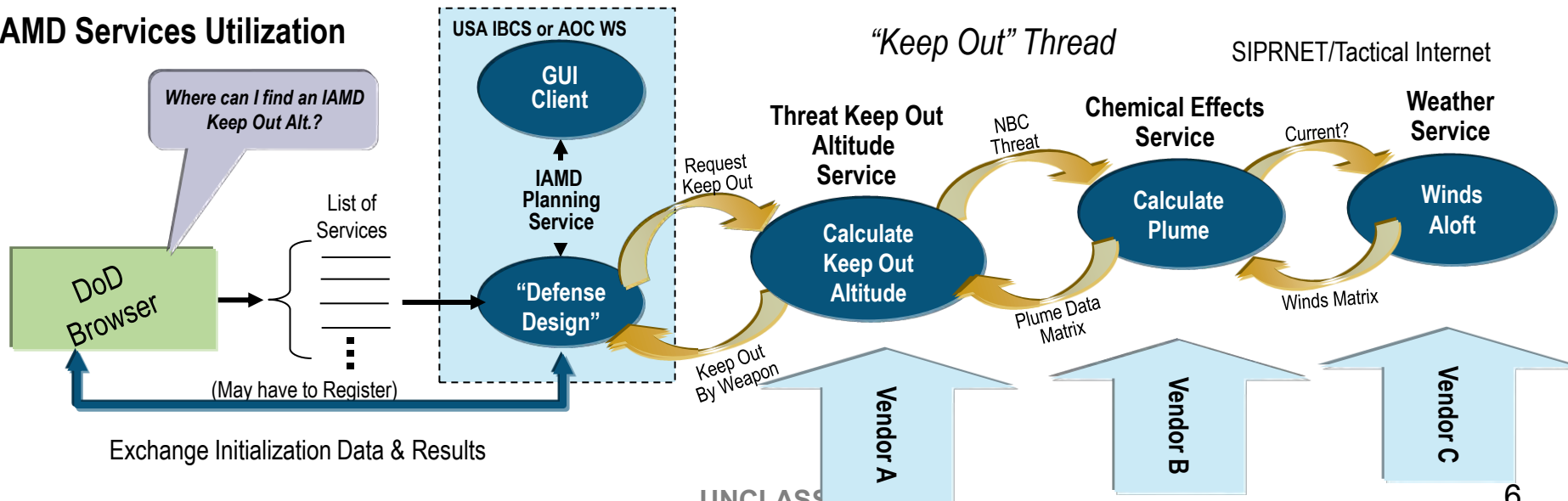


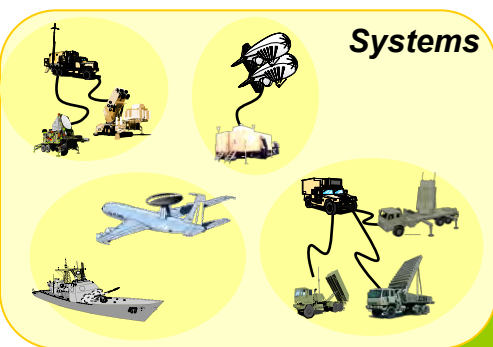
JIAMD Mission Services (Use Commercial Approach)

Commercial Services Utilization



JIAMD Services Utilization



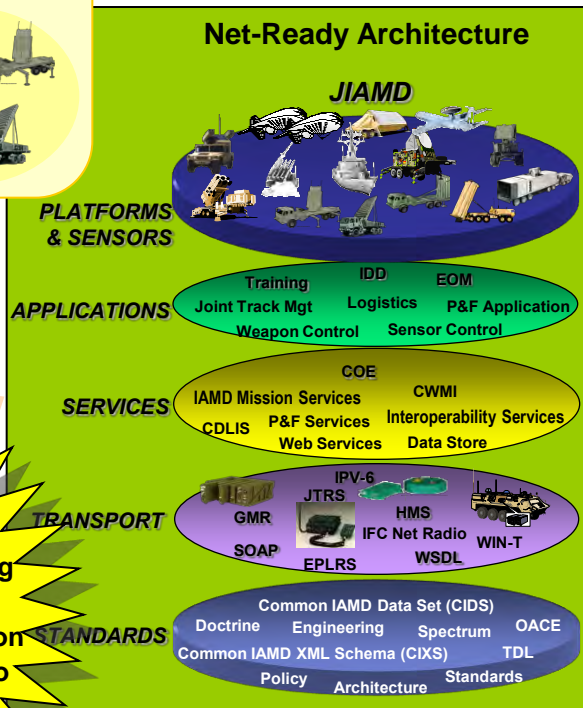


Mine Components and Services

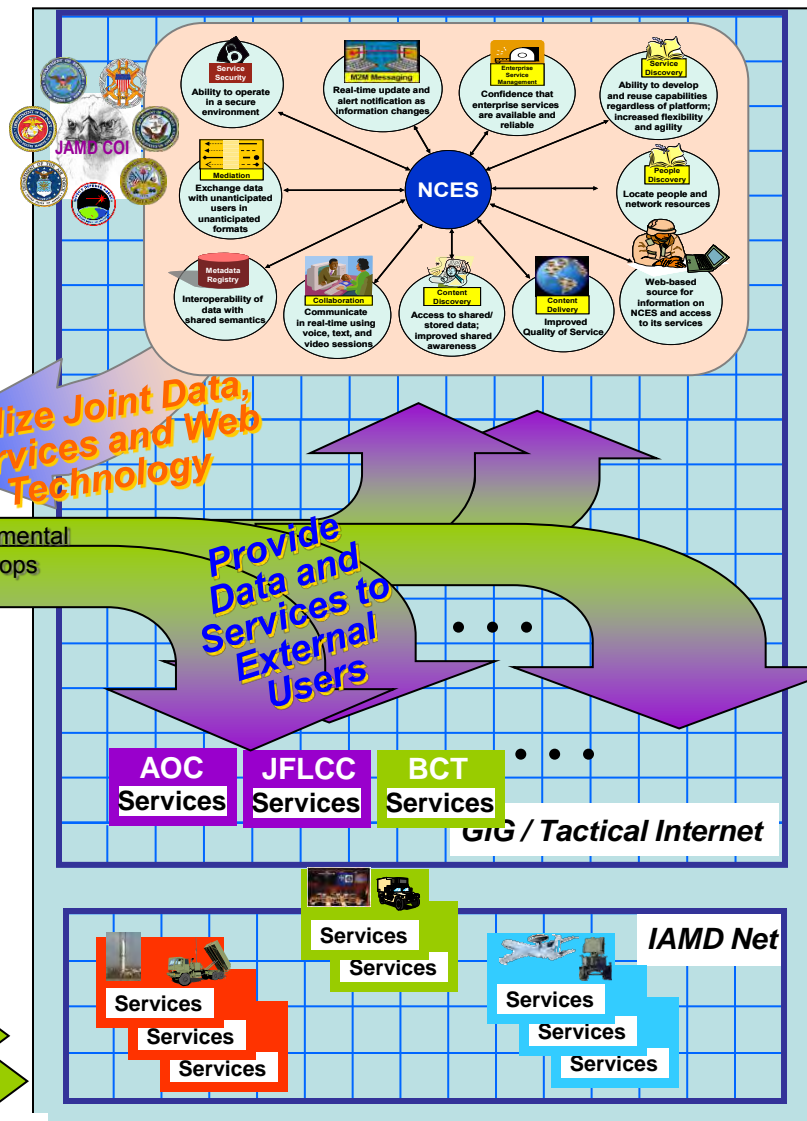
NET READY =
Provide/Consume Data
and Mission Services using
Web Technology/SOA
Distributed to Many Users on
the GIG/Tactical Internet to
Accomplish the Mission!

LEGEND

GIG: Global Information Grid
NCES: Net-Centric Enterprise Services
IFC: Integrated Fire Control
SOA: Service-Oriented Architecture



Transform into Net-Ready Components and Services

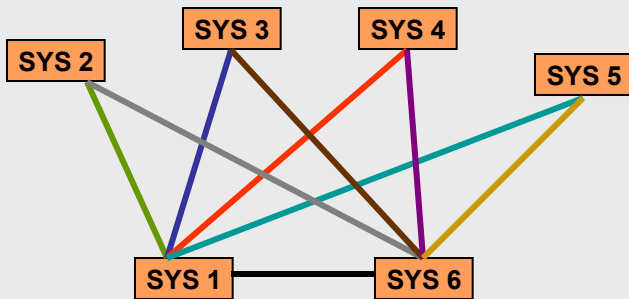


Evolution of IAMD Data Exchange

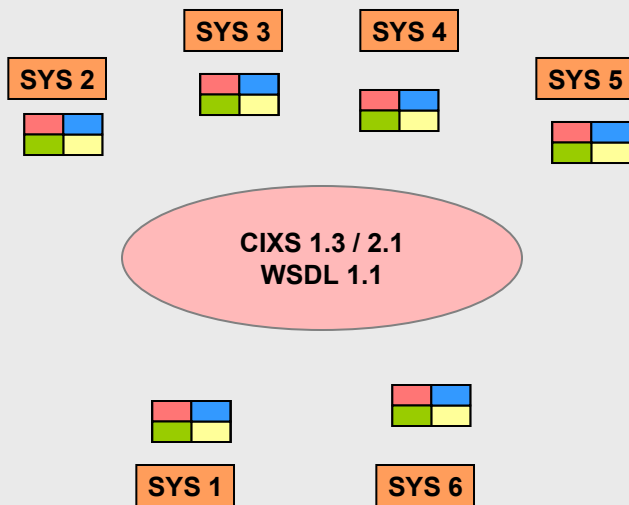
From Legacy Stovepipes to a Service Oriented Architecture

(NOTIONAL)

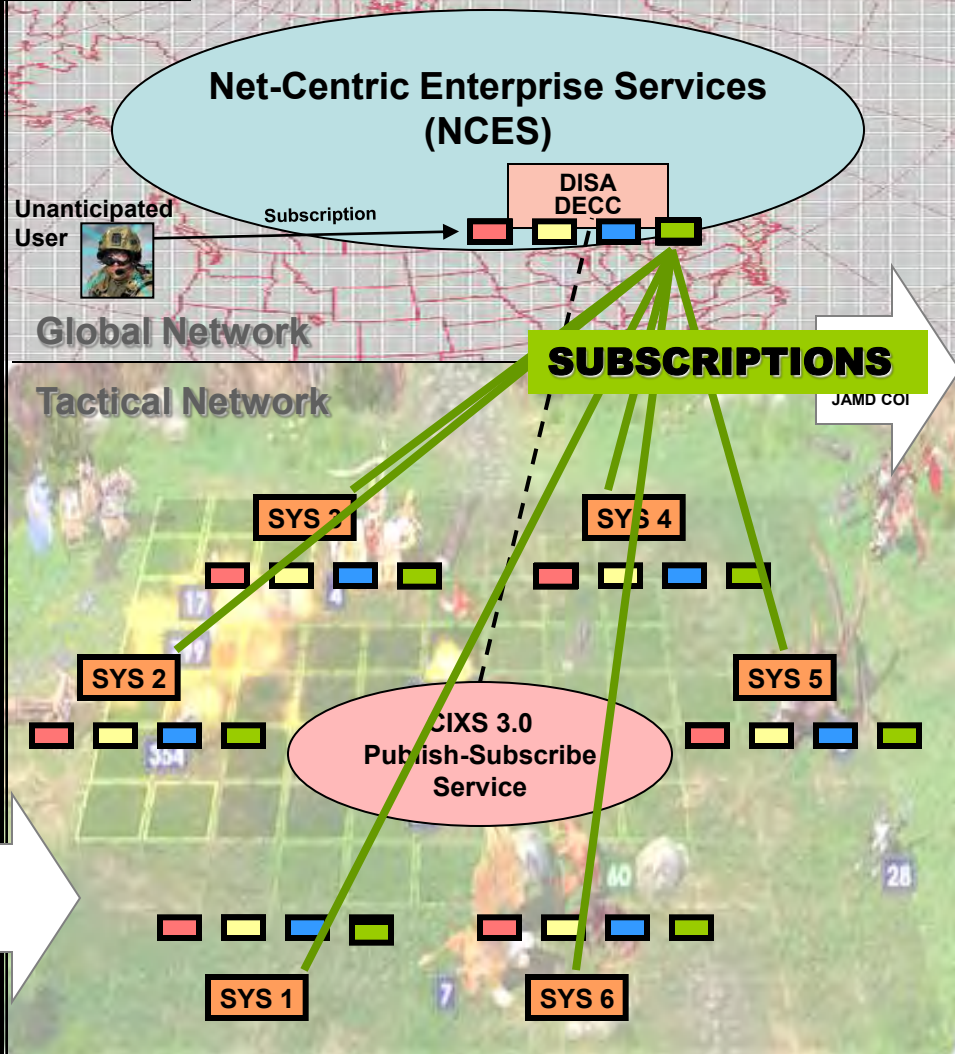
Pre-CIXS Unique Stovepipe Interfaces



CIXS 1.3 & 2.1 Common Stovepipe XML Interfaces

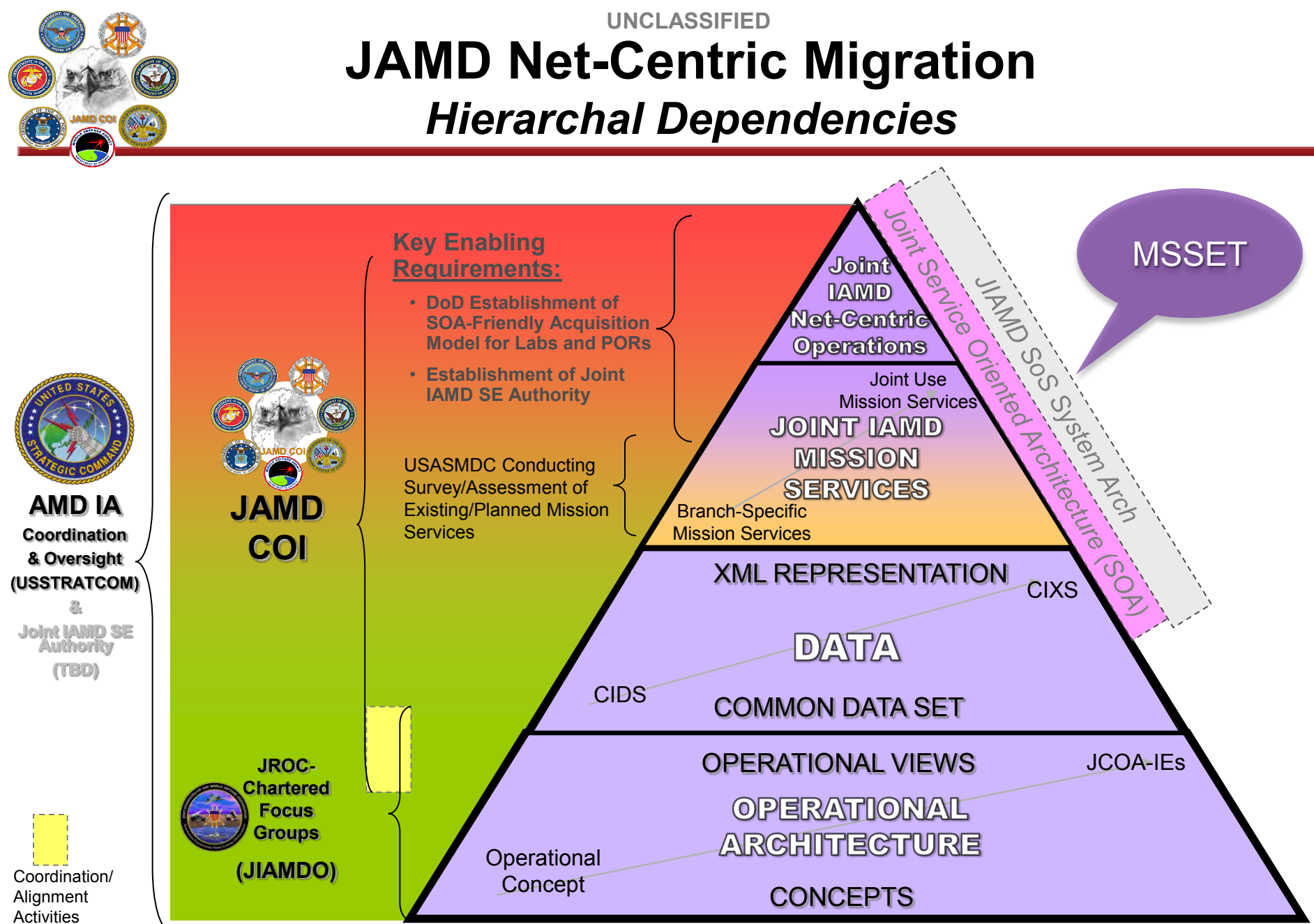


CIXS 3.0 Net-Centric Data Exchange



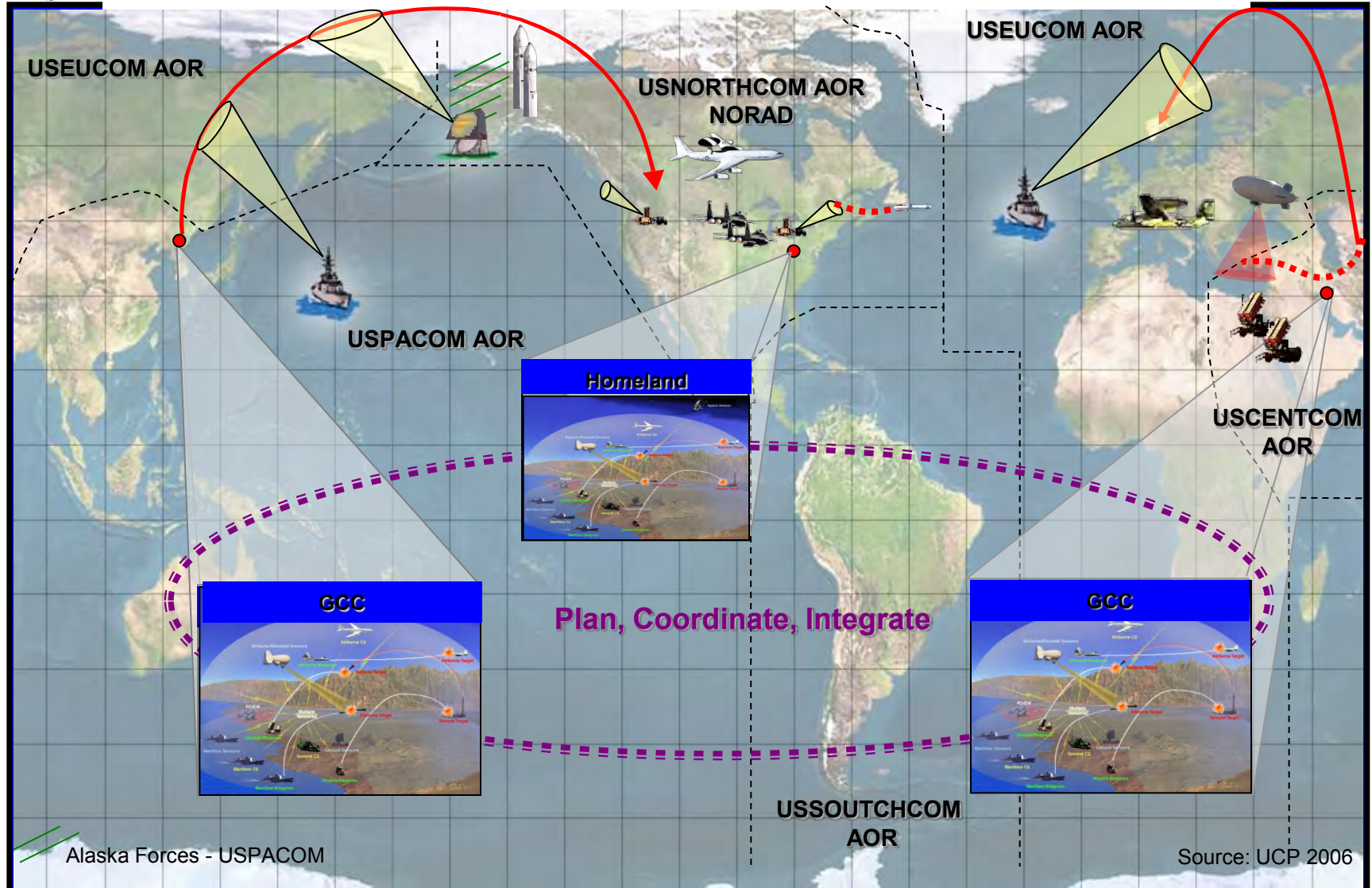
JAMD Net-Centric Migration

Hierarchal Dependencies



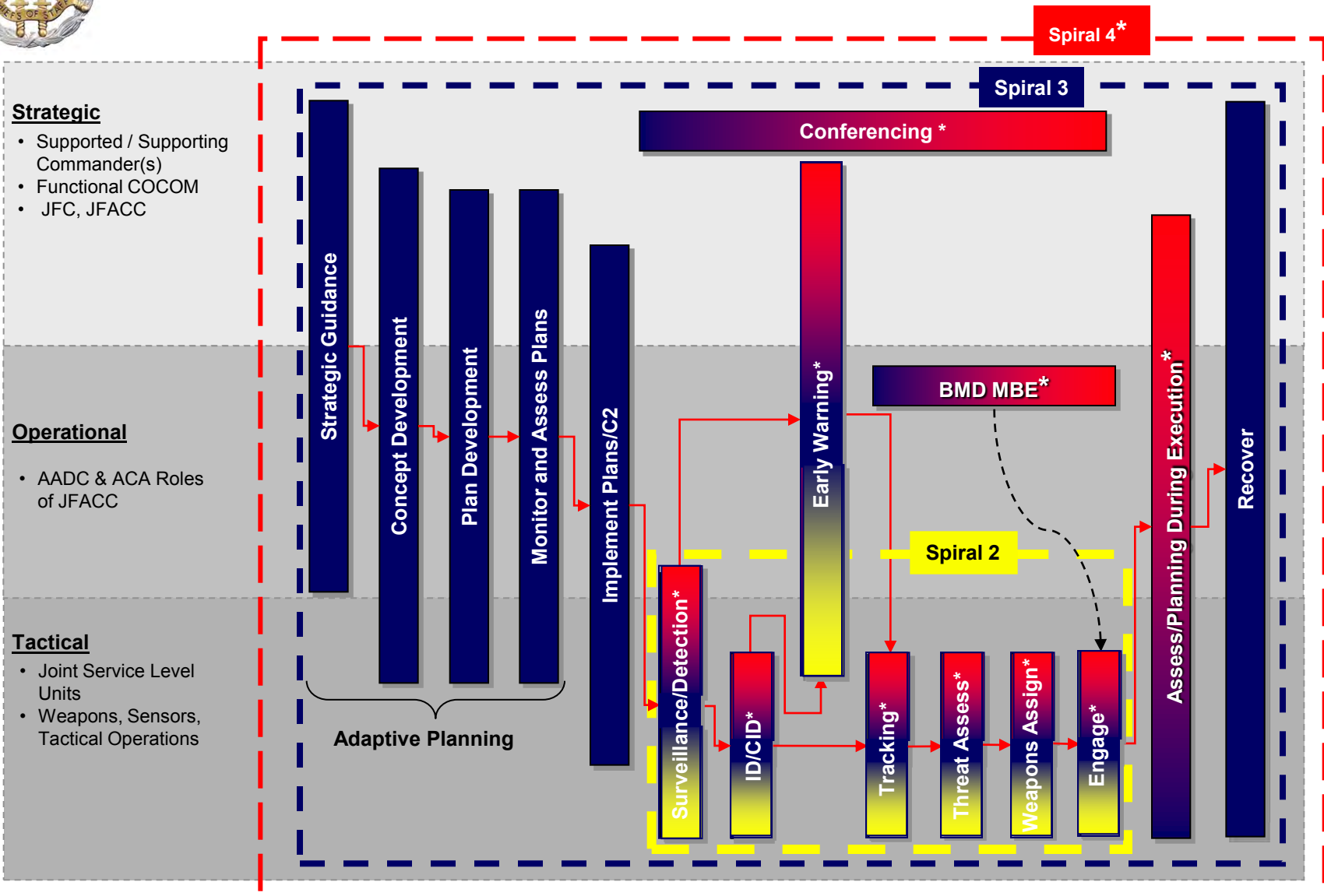


2015 Integrated Air and Missile Defense



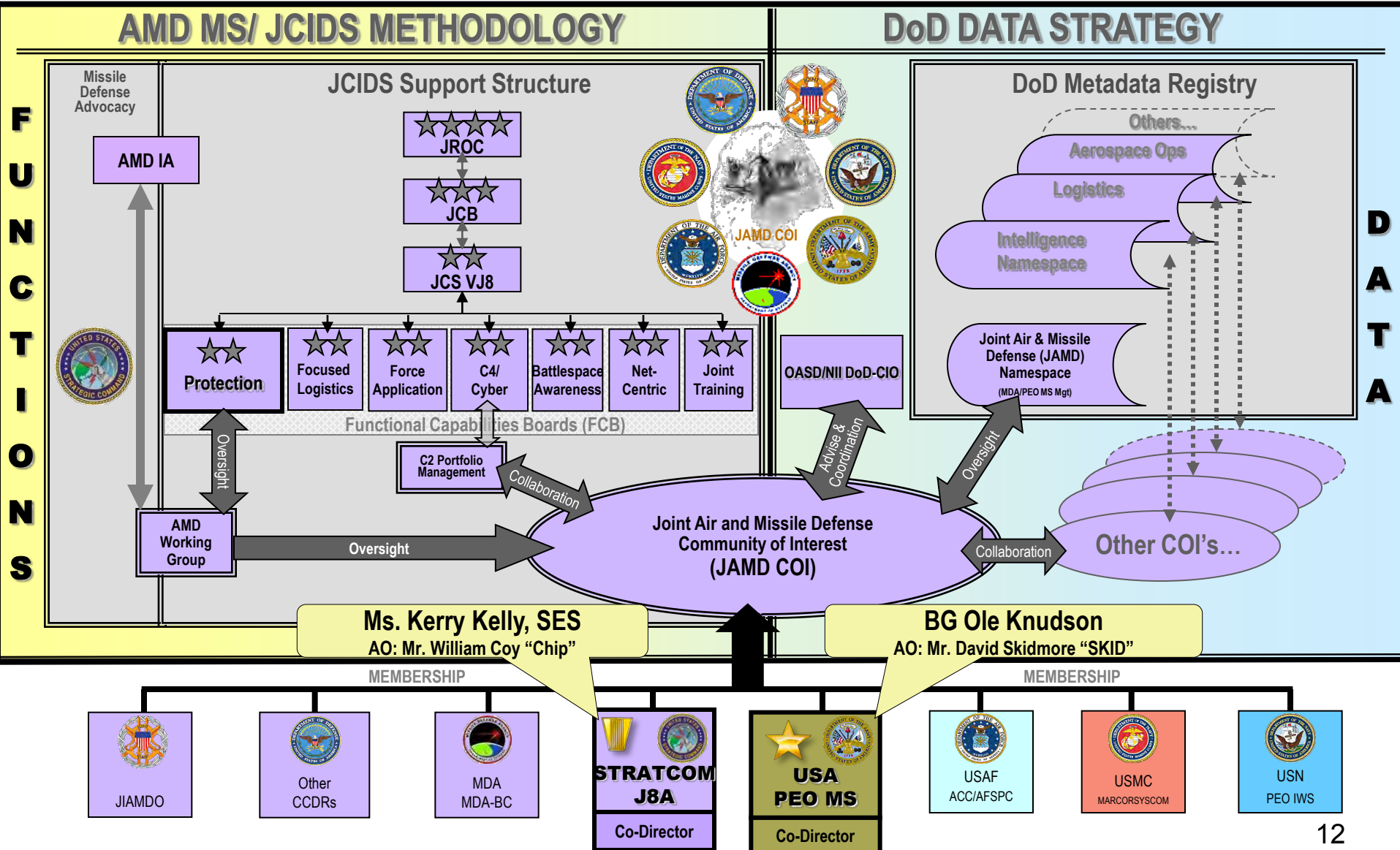


JIAMD Operational Architecture Scope (U)

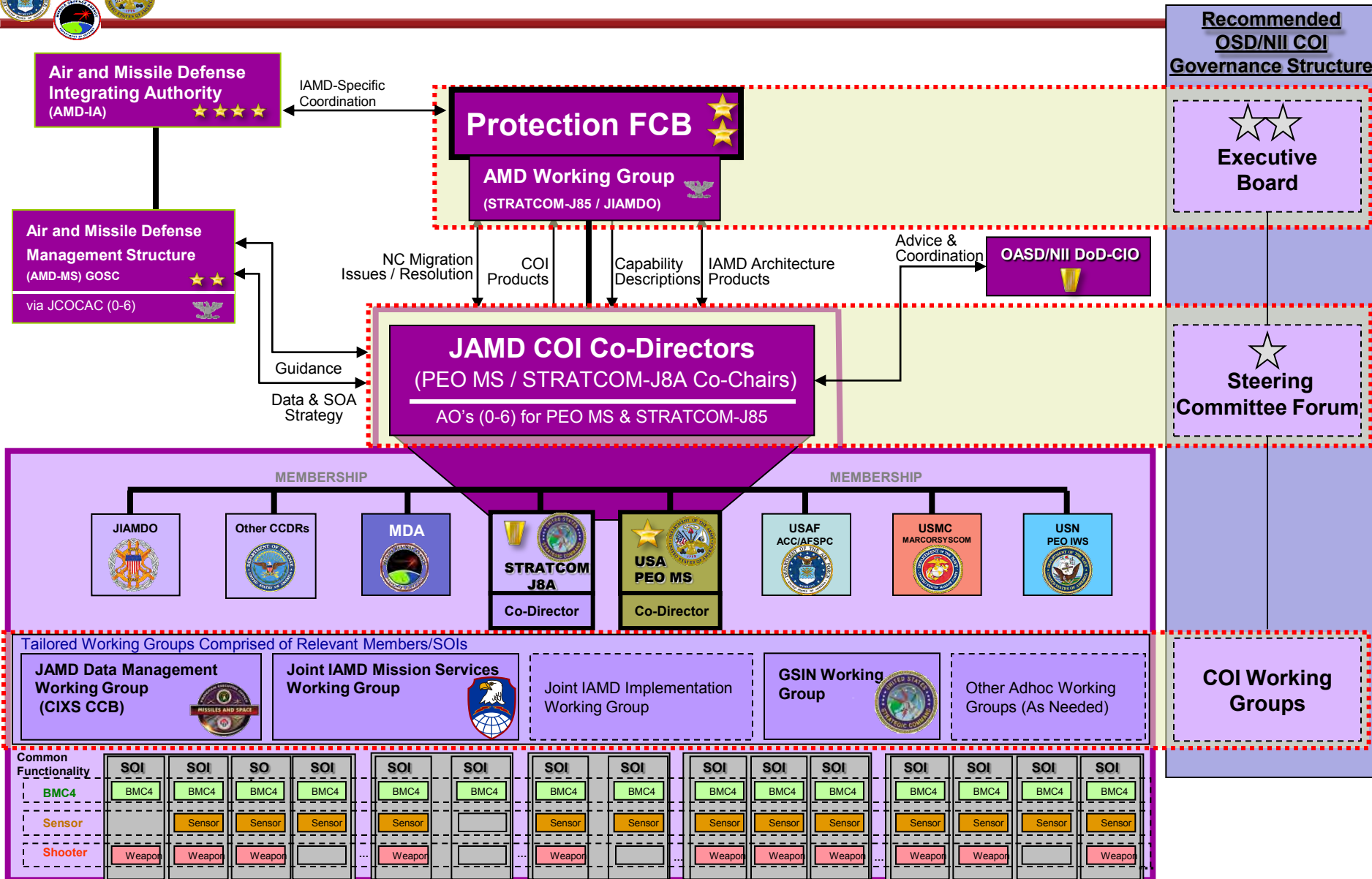


Joint Air and Missile Defense Community of Interest

JAMD COI Collaboration



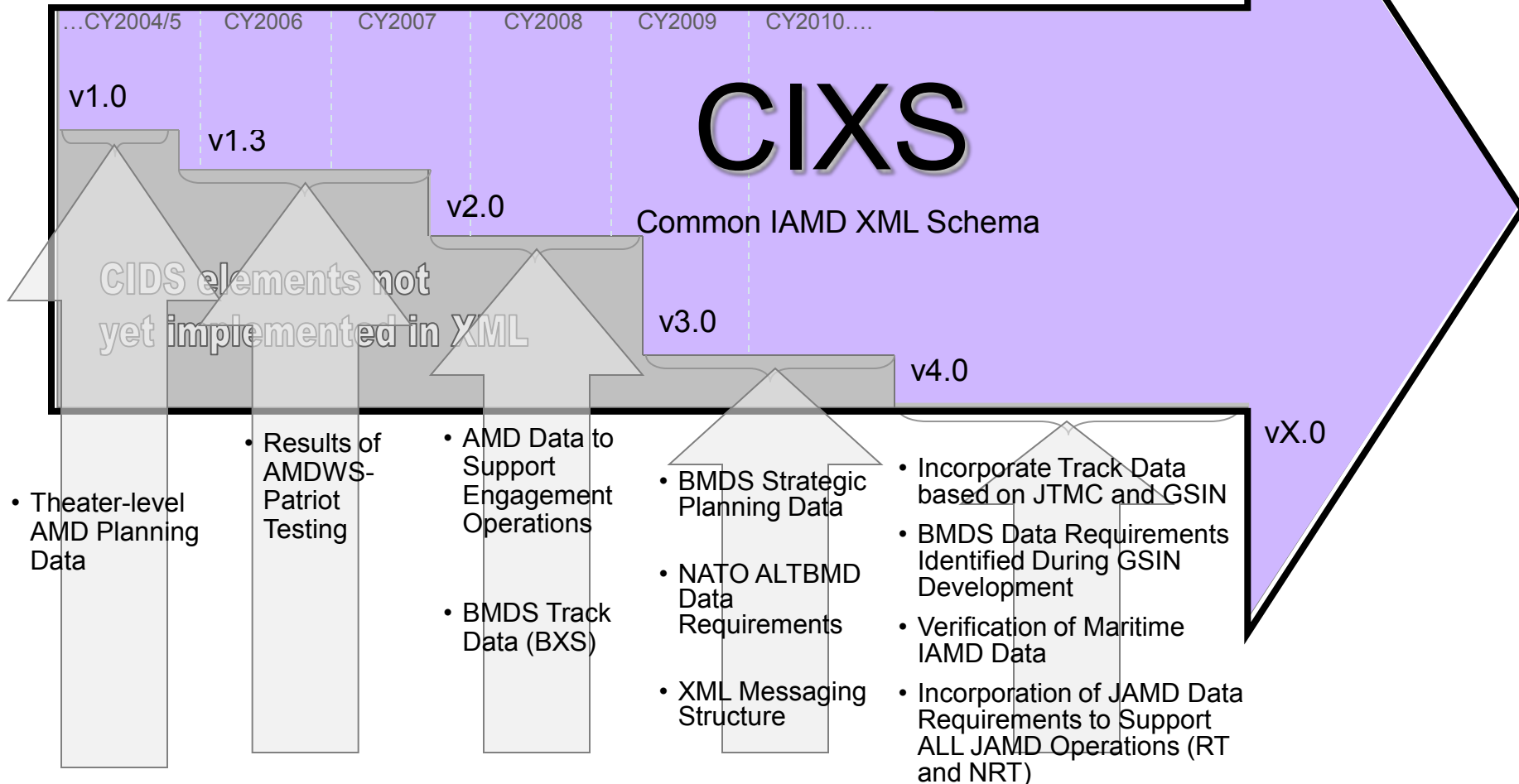
JAMD COI Governance/Advocacy



SOI = Systems of Interest
Derived from the Fundamental Systems List (FSL)

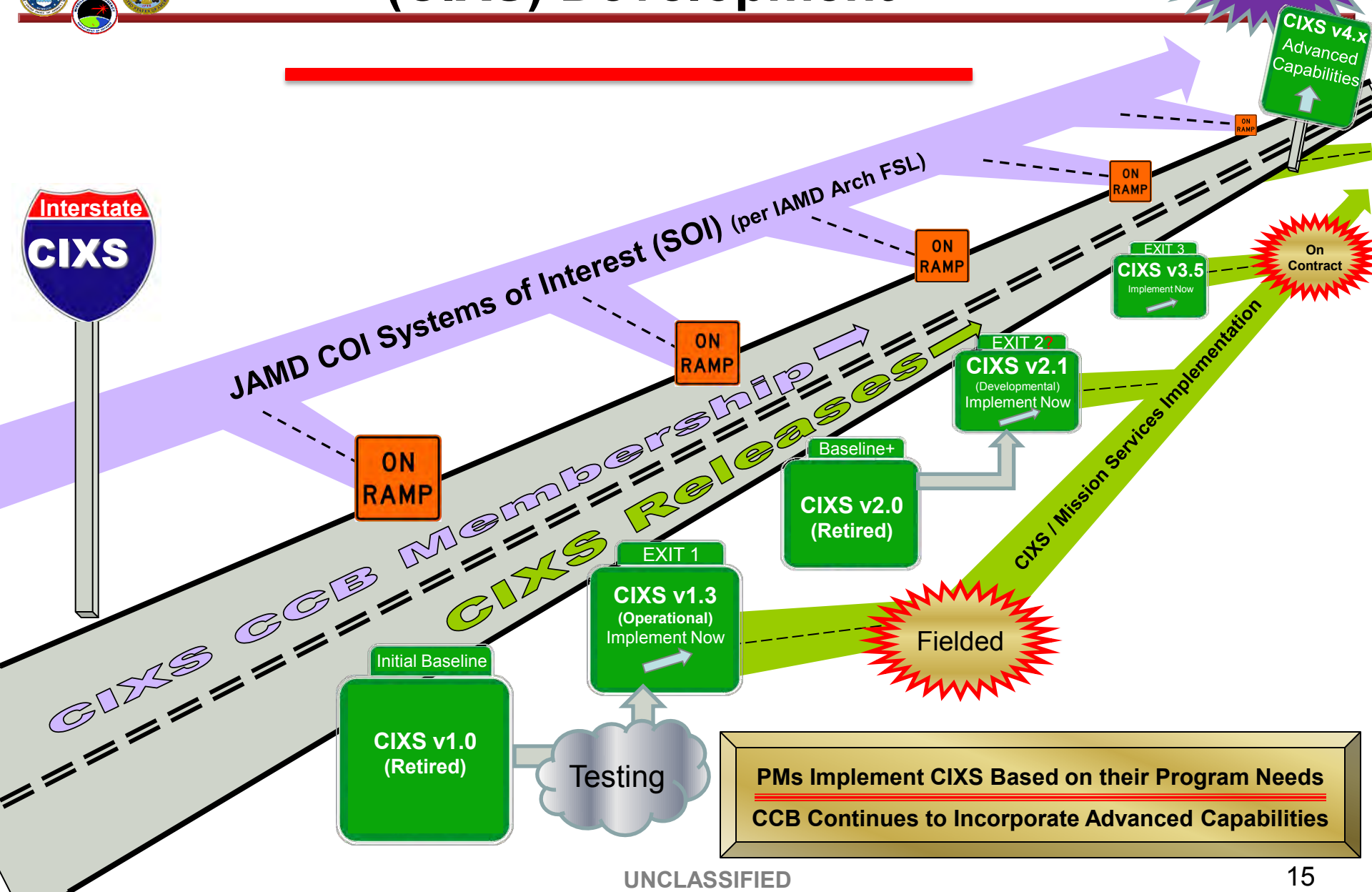
CIXS

Net-Centric Standard for the JAMD Community

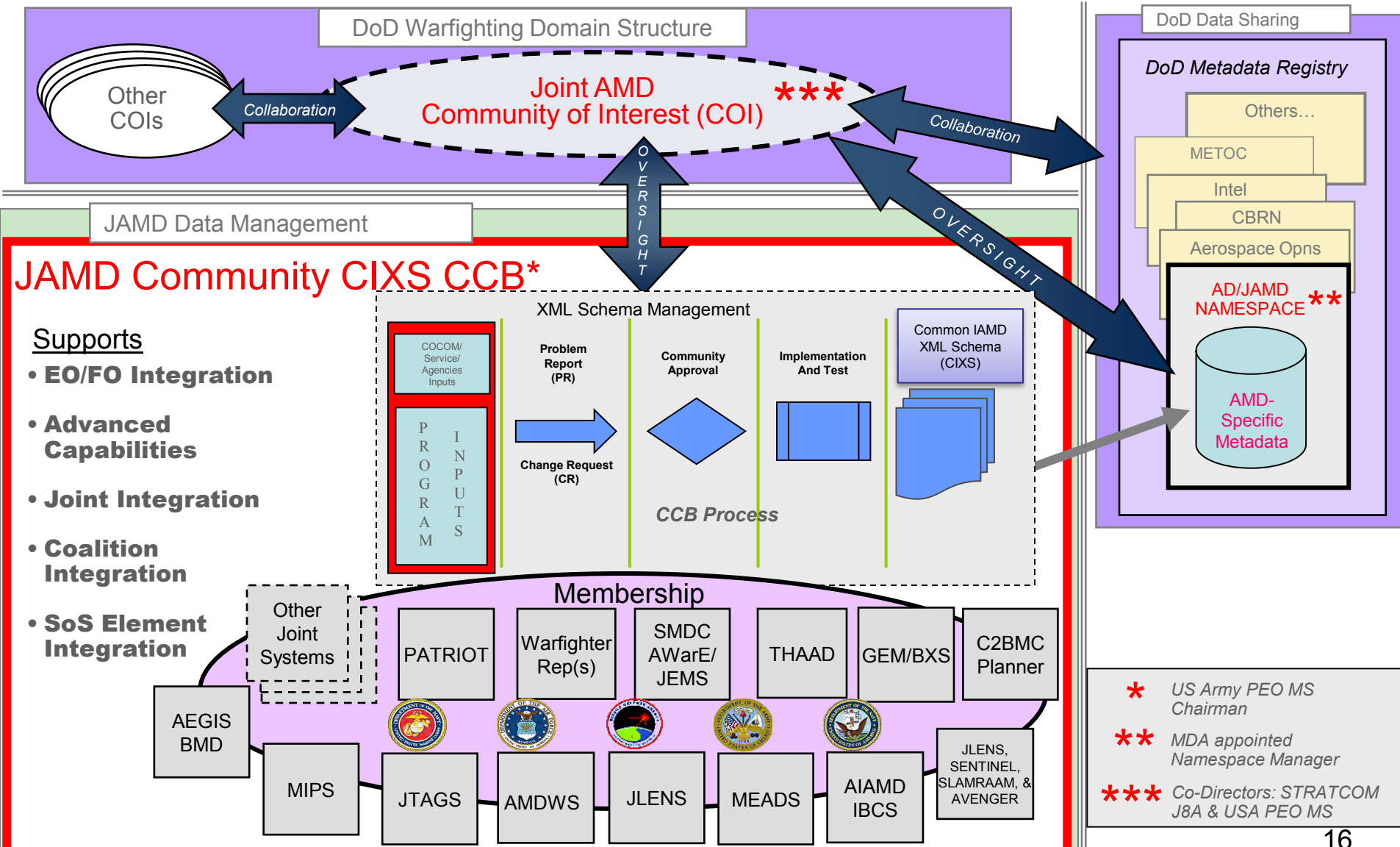


Common IAMD XML Schema (CIXS) Development

Net-Centric Operations and Warfare



JAMD Data Management Process



Guiding Principles

- Accept DoD *Net-Centric Data Strategy as directive*
- *Data Development is “Capabilities Based” IAW JCIDS and determined by each community’s warfighter functional requirements*
- **Use the most effective & efficient means of transferring technical data (machine-to-machine)**
- **Present the user anything he/she wants via the warfighter display (GUI)**
- **Capture objective data definitions and metadata using XML to support:**
 - Near-term implementation
 - Future implementations of advanced capabilities
 - Data exchange in support of Service Oriented Architectures and Militarized Web Technology
- Implement objective data in **XML as technology allows** (e.g. OTA bandwidth limitation)
- **A common data set that supports all activities of the JAMD Warfighter.**
 - **Enables planning/weapon systems initialization integration**
 - **Seamless near real time replanning with engagement operations**
- **Use legacy TDL/MTF elements if they support operational data requirements to achieve NCOW objectives**
- **Eliminate costly redundant and inconsistent legacy data elements**
- Intent of Joint Capabilities Integration and Development (JCIDS) can only be met by **collaborative Joint Material Development** (e.g. Joint Track Manager-JTM)

- GUI – Graphic User Interface
- JCIDS – Joint Capabilities Integration & Development System
- MTF – Message Text Format
- OTA – Over the Air
- TDL – Tactical Data Link

Guiding Principles Evolved From Joint Data Development Experience

- **CIDS/CIXS:** Common Data / XML Schema for all JIAMD activities
- **JAMD Vocabulary:** List of operational terms and definitions for entities and concepts within the JAMD domain; coordinated among the Services/MDA
- **JAMD Discovery Taxonomy:** A hierarchal categorization of JAMD data to enable search and discovery based on functional use; Synchronized with the DoD Core Taxonomy
- **JAMD Net-Centric Assessment Toolkit:** Tool to support PM self-assessment of their program's net-centric profile; Enables PMs to access the impact of net-centric investments on the program's mission effectiveness; Results support Enterprise level assessments
- **JAMD Web Service Standards and Implementation Guidance:** Provides recommendations regarding the use of web services from the W3C web service stack as well as implementation guidance based on actual implementation experience and pilots
- **JAMD Mission Services Survey:** Listing of known JIAMD Mission Services and associated analysis as related to the JIAMD Operational Architecture.
- **JAMD Pedigree Logical Data Model:** Provides recommended pedigree data/attributes for use in JAMD data exchange. Includes pedigree business rules, use cases, and conceptual data model. :



JIAMD Web Service Survey & Assessment

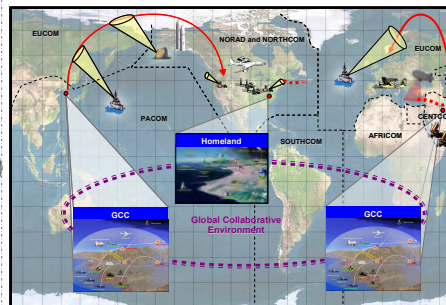
2009-2010 Assessment

JIAMD 2009 WS Survey

- Web Services Responses Include:
 - USAF 22
 - US Army 22
 - US Navy 7
 - ALT BMD (NATO) 6
 - MDA 6
 - STRATCOM 2
 - IBS 1
 - DISA 1
- Total JIAMD Web Svcs. 67

Map
to

IAMD ARCHITECTURE



JIAMD Activities: 544

Also
Done

IAMD Activities Mapped to COCOM Capability Gaps

**GAP
TABLE**
IAMD
Activities

IAMD Capability
Gaps

Next Step: COMPARE

ANSWERS for IAMD Architecture

Table 1 - What IAMD activities are
satisfied by JIAMD Web Services?

Table 2 - What JIAMD Web
Services support the same IAMD
activities?

PLANNING:	177
ENGAGE:	186
ASSESS:	18
Activities Mapped:	197*

*Many activities mapped to more
than one category

Results

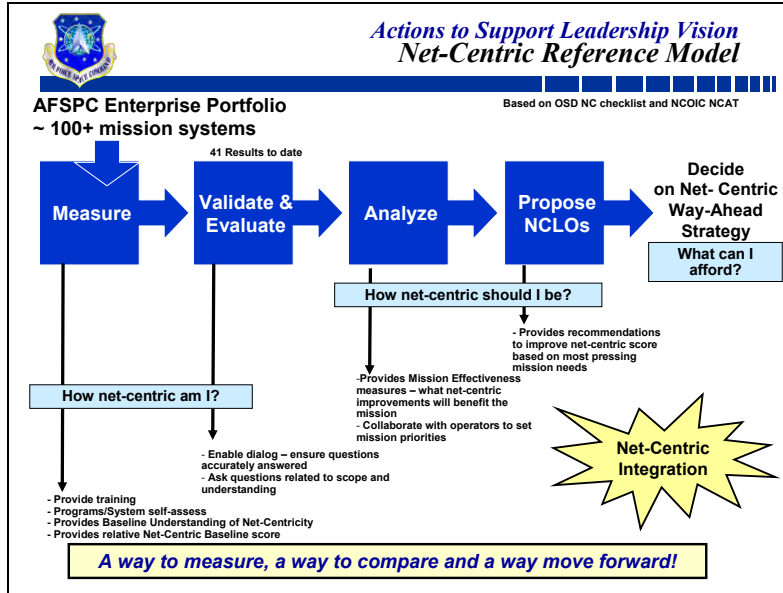
IAMD Activities Covered by JIAMD Web Services

TABLE 1 IAMD Activities

TABLE 2 - Reverse Mapping

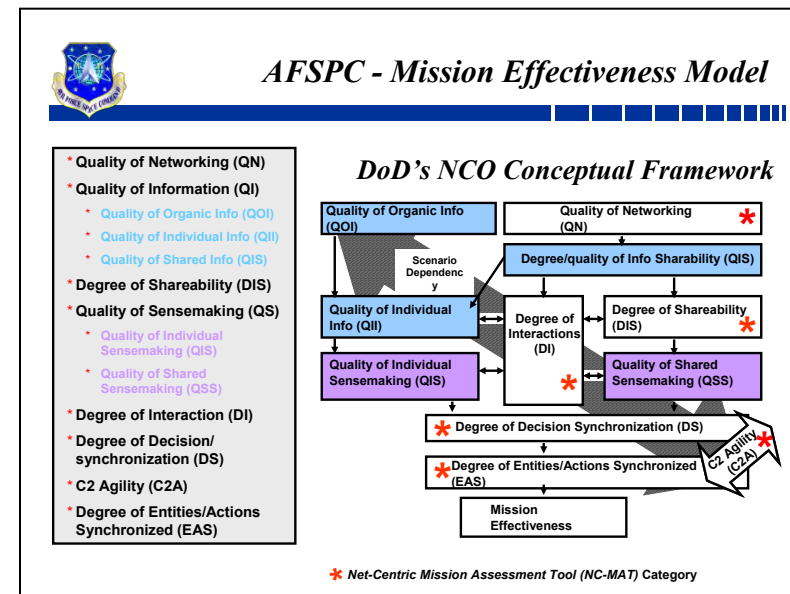
What Web
Services Will
Satisfy JIAMD
Gaps?

Net-Centric Assessment Tool











- Leveraging the USAF Space Command (AFSPC) Net-Centric Assessment Tool to support Net-Centric assessment of JAMD programs
- Based on PM self-assessment using the DoD NC Checklist as the baseline
- Provides recommended actions to PM to increase mission effectiveness through Net-Centric improvements
- Currently being updated to reflect current DoD guidance

- Mission Effectiveness Model (MEM) enables PMs to prioritize enhancements to net-centricity
 - What is the projected impact on mission effectiveness of a proposed net-centric enhancement?
 - What options provides the greatest ROI?
- AFSPC POC is Mr. Ed Strecker, (719) 554-5549, Edward.strecker@peterson.af.mil



Joint Air and Missile Defense Community of Interest

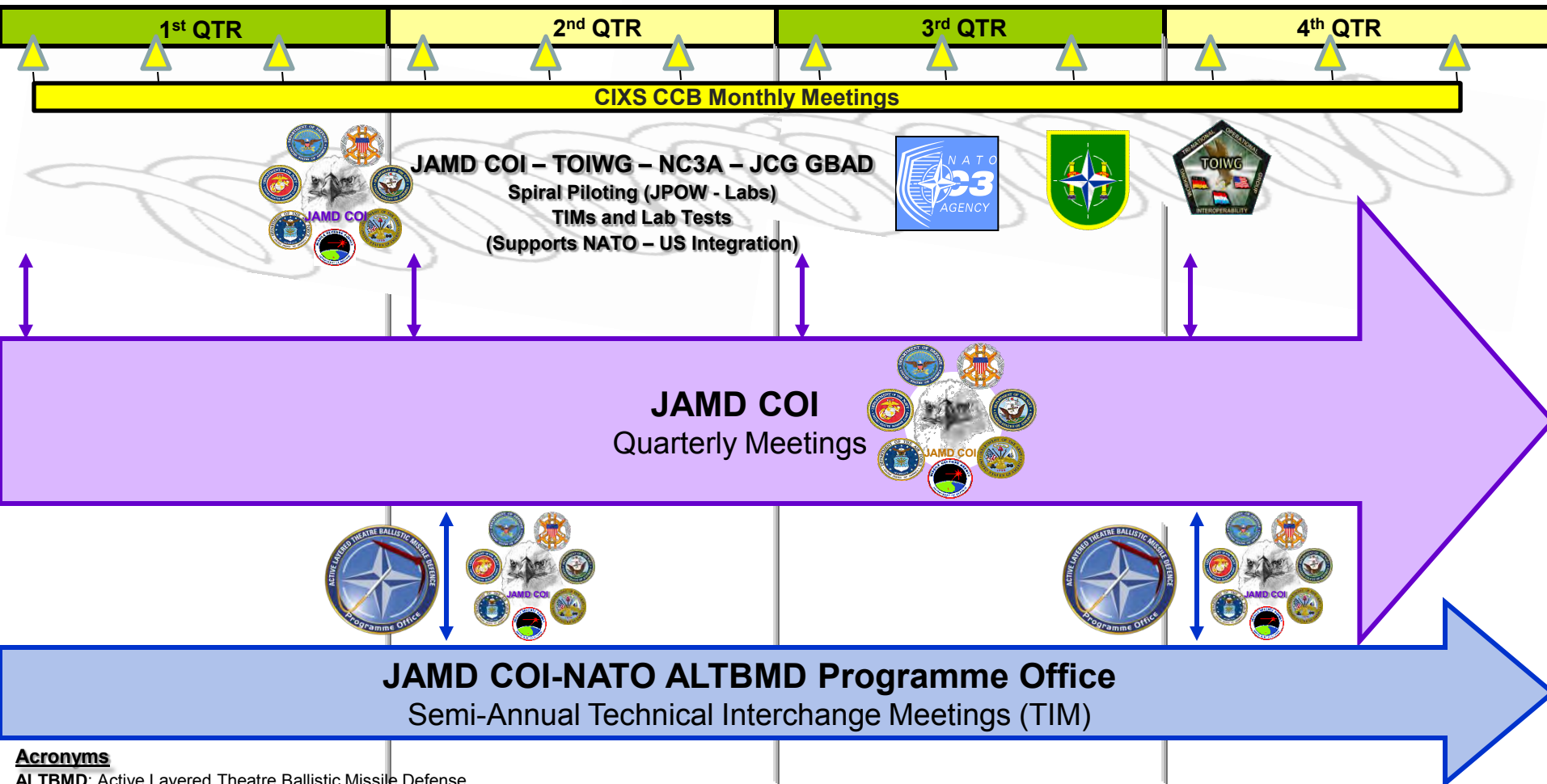
Multinational Integration Activities

- **NATO ALTBMD Programme Office** 
 - Collaboratively developed XML messages to support evolution of CIXS 3.0
 - Released CIXS 3.1 to NATO in Mar 2009 in support of ALTBMD schedule; CIXS 3.3 Released Jul 2010
 - Participated in Web Service Workshops on 3-4 June and 7-8 Oct 09 to establish common approach for Web Service development.
 - CIXS data workshop with NATO 7-9 Sep 2010 to satisfy NIDD IER requirements
 - CIXS 3.4 on contract for NATO ACCS
- **NATO C3 Agency (NC3A)** 
 - Released Common IAMD XML Schema (CIXS) to NC3A Nov 2005
 - Collaboratively planned Multinational IAMD Planning Pilot executed at JPOW-X
 - Implemented CIXS in NATO Planning Tool (PlaTo)
 - Demonstrated new defense planning Web Service utilizing CIXS 1.3 – Very Successful
 - Conducted pilot during JPOW-2010 using CIXS 3.1 pub/sub web service – Very Successful
- **NATO Joint Capability Group for Ground-Based Air Defense (previously LCG-4)** 
 - USA PEO MS providing IAMD Net-Centric Integration expertise in support of JCG-GBAD activities
 - Germany, Britain, and US SHORAD conducted experiment as part of 2010 Tri-Partite MOU, using CIXS for sensor and weapon data exchange
- **Plus...**     

Joint Air and Missile Defense Community of Interest



NATO Coordination Schedule



Acronyms

ALTBMd: Active Layered Theatre Ballistic Missile Defense
COI: Community of Interest
JAMD: Joint Air and Missile Defense
JPOW: Joint Project Optic Windmill
JCG GBAD: Joint Capability Group – Ground-Based Air Defense
NC3A: NATO Consultation, Command & Control Agency
TOIWG: Tri-national Operational Interoperability Working Group



NATO ALTBMD Programme Office Coordination

- Conducted Data Workshop with NATO ALTBMD on 07-09 September 2010
 - Primary objective was to resolve data for C2BMC – NATO ACCS interface by December deadline
 - Secondary objective was to conduct the JAMD COI – NATO ALTBMD TIM
- Conducted Data Workshop with NATO ALTBMD on 08 March 2011
 - Assessment resulted in 23 change requests being submitted to CIXS CCB for action
 - Results will be reflected in new baseline (CIXS 3.5)

JAMD COI DKO Workspace

(URL: <https://www.us.army.mil/suite/page/498325>)



Home ▾ My Account ▾ Favorites ▾ Quick Links ▾ Self Service ▾

Search... AKO Content ▾ Search

Joint Air and Missile Defense (JAMD) COI Home (Related Content ▾)

Remove from Favorites Options ▾

[AKO Home](#) > [DoD Organizations](#) > [Office of the Secretary of Defense](#) > [DoD CIO](#) > [Joint Air and Missile Defense \(JAMD\) COI](#) > [Joint Air and Missile Defense \(JAMD\) COI Home](#)

Welcome to Joint Air and Missile Defense (JAMD) COI

Options

Joint and Missile Defense (JAMD) COI Leader's Message

Options



Welcome to the JAMD COI Workspace

On behalf of the Co-Directors of the Joint Air and Missile Defense Community of Interest: Ms. Kerry Kelly, US STRATCOM and BG Ole Knudson, USA PEO Missiles and Space: WELCOME! Our Mission: Joint (Integrated) Air and Missile Defense Customer: Any Warfighter - Anywhere - All the Time!

[» AO for JAMD COI](#)

Joint Air and Missile Defense (JAMD) COI Announcements

Options

2 Feb 2011 18:19 GMT

Last JAMD COI meeting was hosted by the Army Program Executive Office Missiles and Space (PEO MS) on 25-26 January in Huntsville, AL. Presentations from that meeting are available in the document library.

[» JAMD COI Meetings](#)

Next JAMD COI meeting is tentatively scheduled to be hosted by the Joint Forces Command (JFCOM)/Lockheed Martin on 27-28 April in Suffolk, VA.

[Current](#) [« Previous](#) [Next »](#) [Archived](#)

Joint Air and Missile Defense (JAMD) COI Links

Options

Joint Air and Missile Defense (JAMD) Namespace

Link to the Joint Air and Missile Defense (JAMD) Namespace within the DoD Metadata Registry and Clearinghouse (MDR&C). If already signed into the MDR&C, this link will take you directly to the JAMD Namespace. If not already logged into the MDR&C, you will be directed to the Homepage. Once logged in to the MDR&C, choose View-Namespaces, open the DODENT-DoD Enterprise folder, and select "JAMD-Joint Air and Missile Defense." The JAMD Namespace contains the Joint Air and Missile Defense Community of Interest (JAMD COI) Common IAMD XML Schema (CXDS) and supporting WSDL and Common IAMD XML Message Set. Dr. Timothy Kearns (MDA BCE/ MITRE), 719-277-4174 is the JAMD Namespace Manager; Mr. Joe Velasquez, 256.864.7038, (PEO MS/BAE Systems) is the Namespace Administrator. Metadata is posted to the JAMD Namespace as authorized by the CXDS CCB. The CXDS CCB serves as the Data Management Working Group under the Joint oversight of the JAMD COI.

JIAMD Web Services Forum

This forum is the home for the Joint Integrated Air and Missile Defense (JIAMD) community to coordinate operational development of Web Services to support the JIAMD Warfighter. This site identifies current Web Services that exist and those planned to support JIAMD capabilities. The site will also provide a forum for the collaboration of work efforts and other assessment and reference products. The JIAMD Web Services Forum serves as the Joint IAMD Mission Services Working Group for the JAMD COI.

JAMD COI Calendar

Options

Upcoming Events

[Full Month View](#) [Add Event](#)

Event: Joint Air and Missile Defense Community of Interest Meeting (JAMD COI)

Time: 4/27/2011 - 4/28/2011 (All-Day)

Location: Suffolk, VA (JFCOM - Lockheed Martin)

Summary:

Joint Air and Missile Defense (JAMD) COI Knowledge Center

Options

Joint Air and Missile Defense (JAMD) COI Files Joint Air and Missile Defense (JAMD) COI

Show 10 [20] 50 100

Add File Add Folder Copy Delete Recycle Bin Download Move Send Link Tiles View

<input type="checkbox"/>	Name	Type	Creator	Size	Date/Time GMT	Version
<input type="checkbox"/>	JAMD COI	Folder	gerald.skidmore	829 files	May 1, 2009 5:07 PM	
<input type="checkbox"/>	JIAMD Summit	Folder	gerald.skidmore	114 files	Mar 2, 2009 10:39 PM	



Summary

- JAMD COI is focused on the Development/Coordination of Common IAMD Data and Mission Services for the JAMD community
- JAMD COI is leading our community's migration to JIIM IAMD Net-Centric Operations and Service Oriented Architectures (SOA)
- Working Closely With:
 - DoD
 - Joint staff
 - CCDRs
 - MDA
 - USA/USN/USMC/USAF
 - Other COIs (e.g. AO, C2 SSA)
 - JPEO IAMD / MSSET
 - NATO NC3A / JCG-GBAD / ALTBMD Programme Office
- Net-Centric SE Activities support PMs in satisfying NR KPP requirements to realize JIAMD Capabilities
- JAMD COI is working closely with Multinational IAMD partners to facilitate interoperable and interdependent IAMD capabilities
- Working to Align Initiatives in support of:
 - Joint Track Management Capability / Combat ID / Integrated Fire Control / Automated Battle Mgt Aids
 - Air and Missile Defense Integrating Authority / AMD Governance
 - NATO Territorial Missile Defense - European Phased Adaptive Approach

JAMD COI, JAMD Namespace, and CIXS CCB are Key Enablers to Implement the DoD Net-Centric Data Strategy and Satisfy the NR KPP

Points of Contact/Questions



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U.S. Army PEO Missiles and Space

Email: gerald.skidmore@us.army.mil

Phone: 256-313-8397

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Missile Defense Advocacy

USSTRATCOM/J851

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Mr. Jose “Joe” Velasquez, CTR

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2nd Annual IAMD Symposium

IAMD Requirements, Plans, and Programs



RADM Frank C. Pandolfe
Director, Surface Warfare Division
OPNAV N86

- **Evolving Threat**
- **Anti-Air Warfare**
 - AAW Weapons
 - NIFC-CA
- **Ballistic Missile Defense**
 - BMD Weapons
 - Modernization and Shipbuilding
 - Aegis Ashore and SBX
- **Summary**

The Evolving Threat - AAW

- Quiet diesel and nuclear submarines armed with anti-ship cruise missiles
- Manned aircraft
- Swarming fast attack craft with short range ASCM
- Coastal defense cruise missiles



Countered With New Ships, Sensors, Weapons

MISSILE SYSTEMS

RAM Blk 2

ASMD

ESSM

AAW (SR)

SM-2 BLK IIIB

AAW (MR)

SM-2 BLK IV

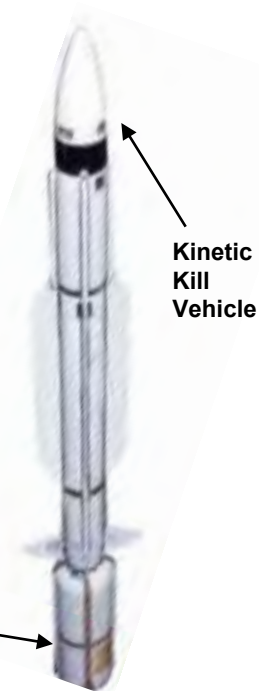
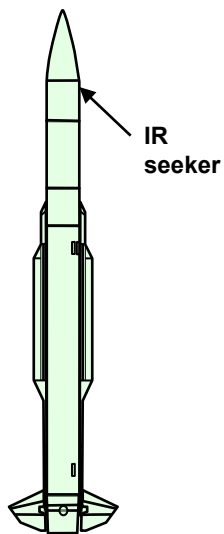
AAW (ER)

SM-6

Advanced IAMD

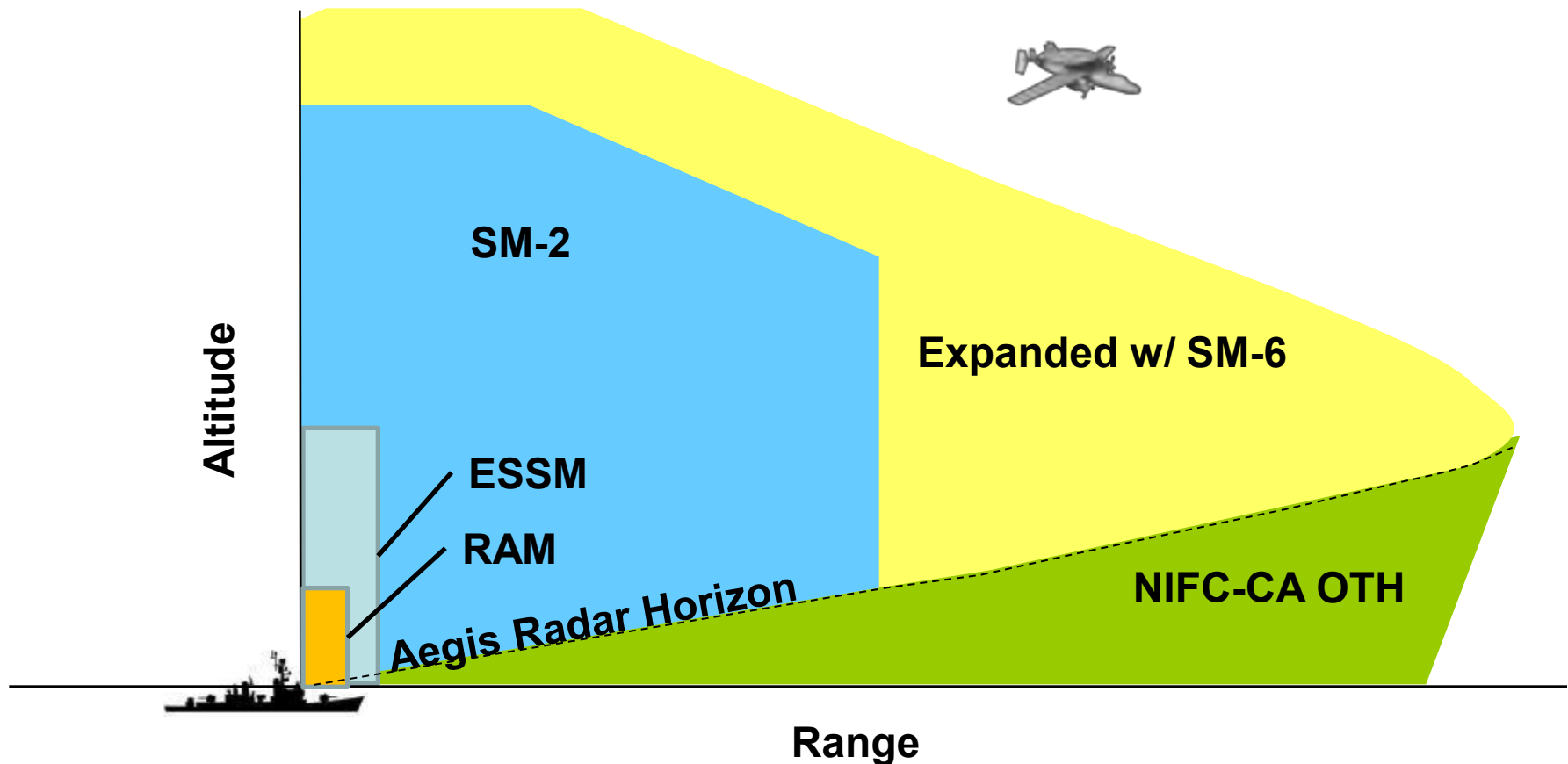
SM-3

BMD



UNCLASSIFIED

IAMD Engagement



PB12 AAW Funding Profiles

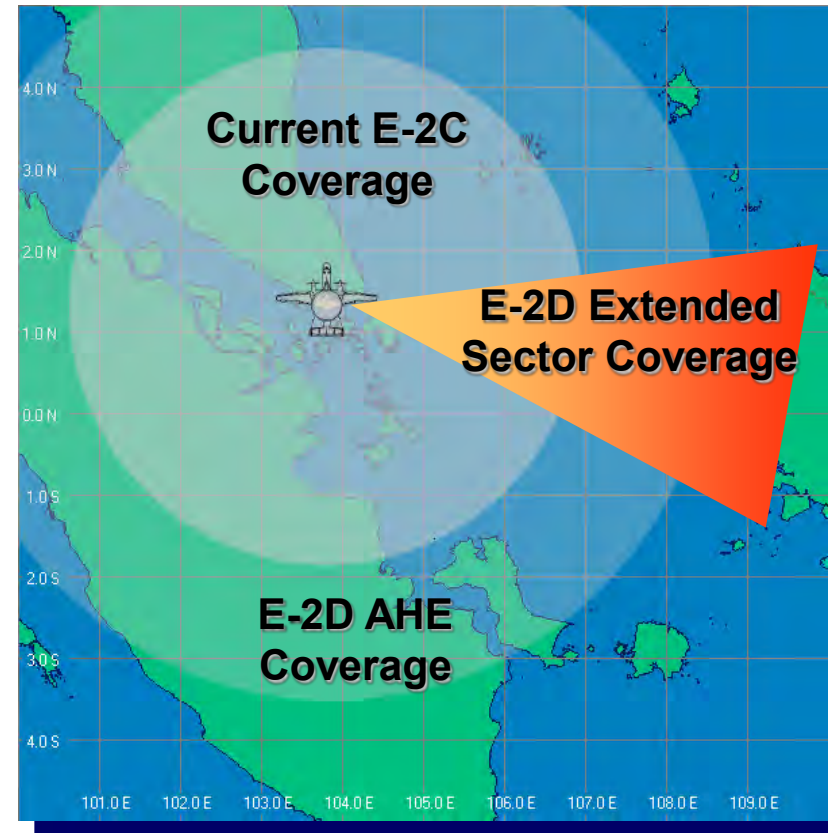
	PB12	<u>FY10</u>	<u>FY11</u>	<u>FY12</u>	<u>FY13</u>	<u>FY14</u>	<u>FY15</u>	<u>FY16</u>	<u>FY12- FY16 Total</u>
RAM	Proc Qty	90	90	61	62	64	90	90	367
	TY\$M	109.2	88.3	71.8	69.8	70.5	84.8	86.9	403.1
ESSM	Proc Qty	43	33	35	35	51	94	94	309
	TY\$M	71.6	63.6	62.8	62.7	81.9	126.1	128.3	461.8
SM-6	Proc Qty	11	59	89	121	129	152	168	659
	TY\$M	211.1	356.1	449.7	560	587.6	658.4	735.3	2991

Naval Integrated Fire Control – Counter Air (NIFC-CA)



- Provides Engage-On-Remote and OTH capability to counter manned aircraft and cruise missiles
- Links E-2D elevated sensor to Aegis ships and Navy fighter aircraft to expand Air Defense battlespace
- Utilizes full kinematic range of active missiles

- Long-range detection of air and cruise missile threats
- Sea target tracking out to the horizon
- Precision tracking of maneuvering targets against ground clutter
- Integrates air and missile defense with strike support
- NIFC-CA IOC FY15
 - Aligned to IOC of first E-2D squadron



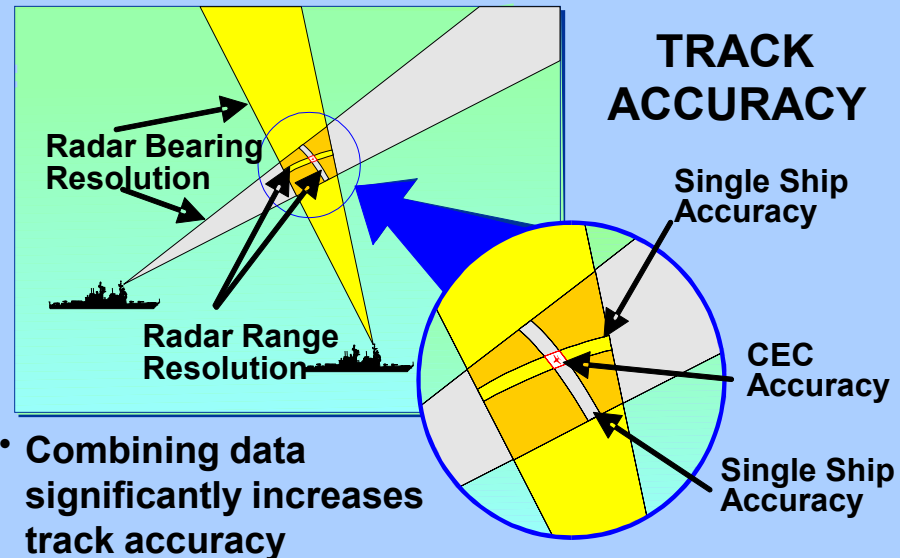
Key Enabler for NIFC-CA Capability

Cooperative Engagement Capability (CEC)

COMPOSITE TRACKING & TRACK CONTINUITY

● UNIT 1
● UNIT 2
● UNIT 3

- Sensor data distributed to all units
- CEC combines filtered data for units with common algorithms
- Provides identical track picture and track numbers
- Superior picture compared to single source



Real Time Force Level Sensor Fusion

- Integrates platforms via a real time sensor fusion network
- Fuses local and remote sensor measurements into Composite Tracks
- Exploits sensor capabilities, geometric relationships, and frequency diversity to overcome tracking discontinuities and improve tracking accuracy

Advanced Capability Build 12 (ACB-12)

- Road to Open Architecture
- Common Processor & Display System
- OA System Track Manager / Track Server
- Enables Rapid Capability Insertion Process
- Allows full kinematic range of the SM-6 missile (NIFC-CA)
 - All sensors considered
 - SM-6 Active Homing
 - Fire-control quality data in real-time
- Foundation of DDGs 113+, DDG/CG Modernization, Aegis Ashore



STANDARD MISSILE-6

- **Mission:**

- Provides theater air defense, fleet area defense, and ship self-defense for sea and littoral forces

- **Description:**

- Solid propellant, tail-controlled, surface-to-air missile
- Separable booster with increased air defense range
- Allows for OTH engagements

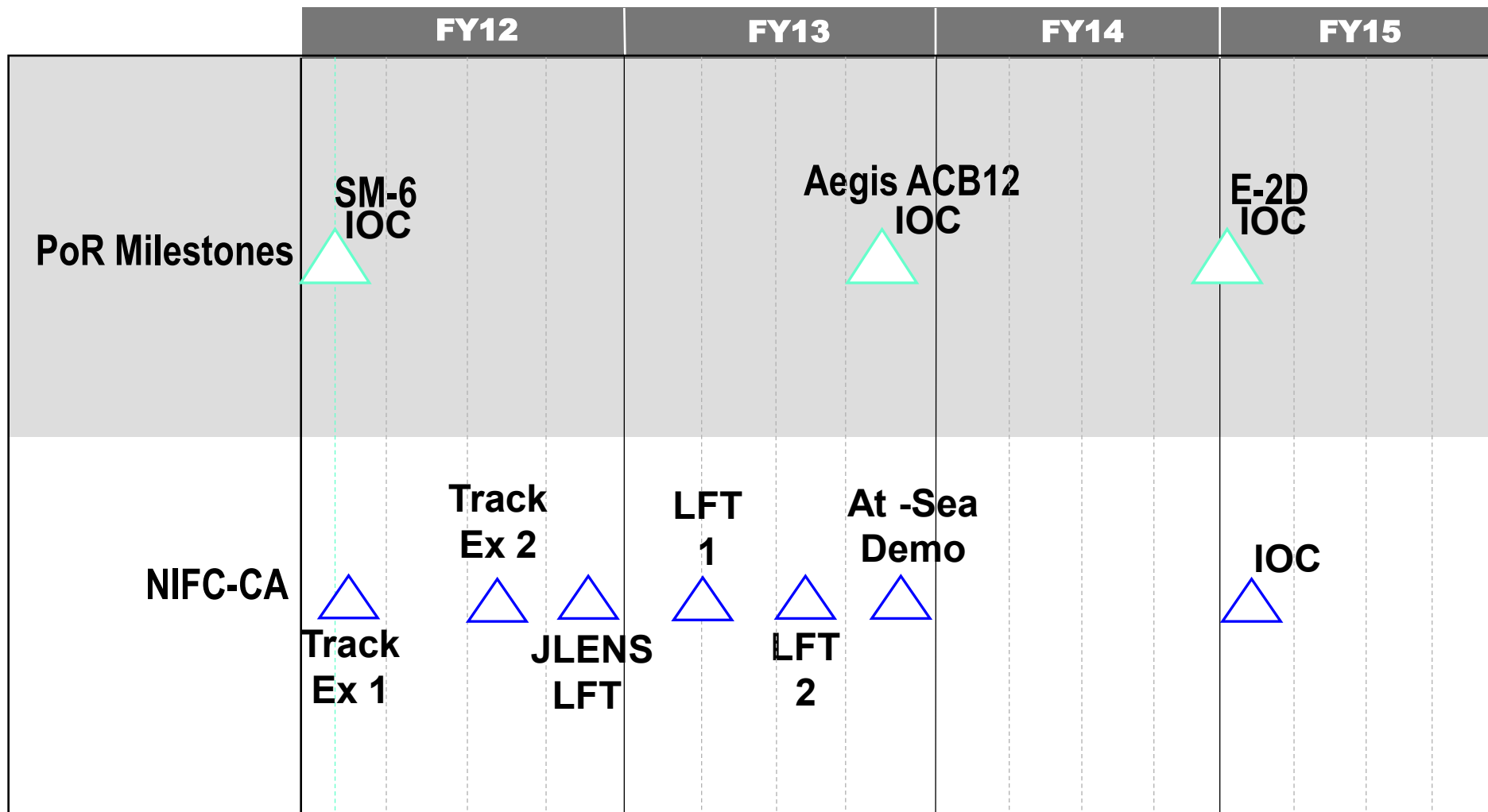
- **Employment:**

- Primary air defense weapon for U.S. Navy AEGIS Cruisers & Destroyers

- **IOC 2012 / FRP late 2012**



NIFC-CA FTS Program Plan



LFT- Live Fire Test

JLENS – Joint Land Attack/Cruise Missile Defense Elevated Netted Sensor System

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Ballistic Missiles

Short Range Ballistic Missiles



CSS-6 Mod 2



SCUD B



Shaheen

Medium Range Ballistic Missiles



Ashura



No Dong



Agni II



Shahab 3

Long Range Ballistic Missiles



CSS-4



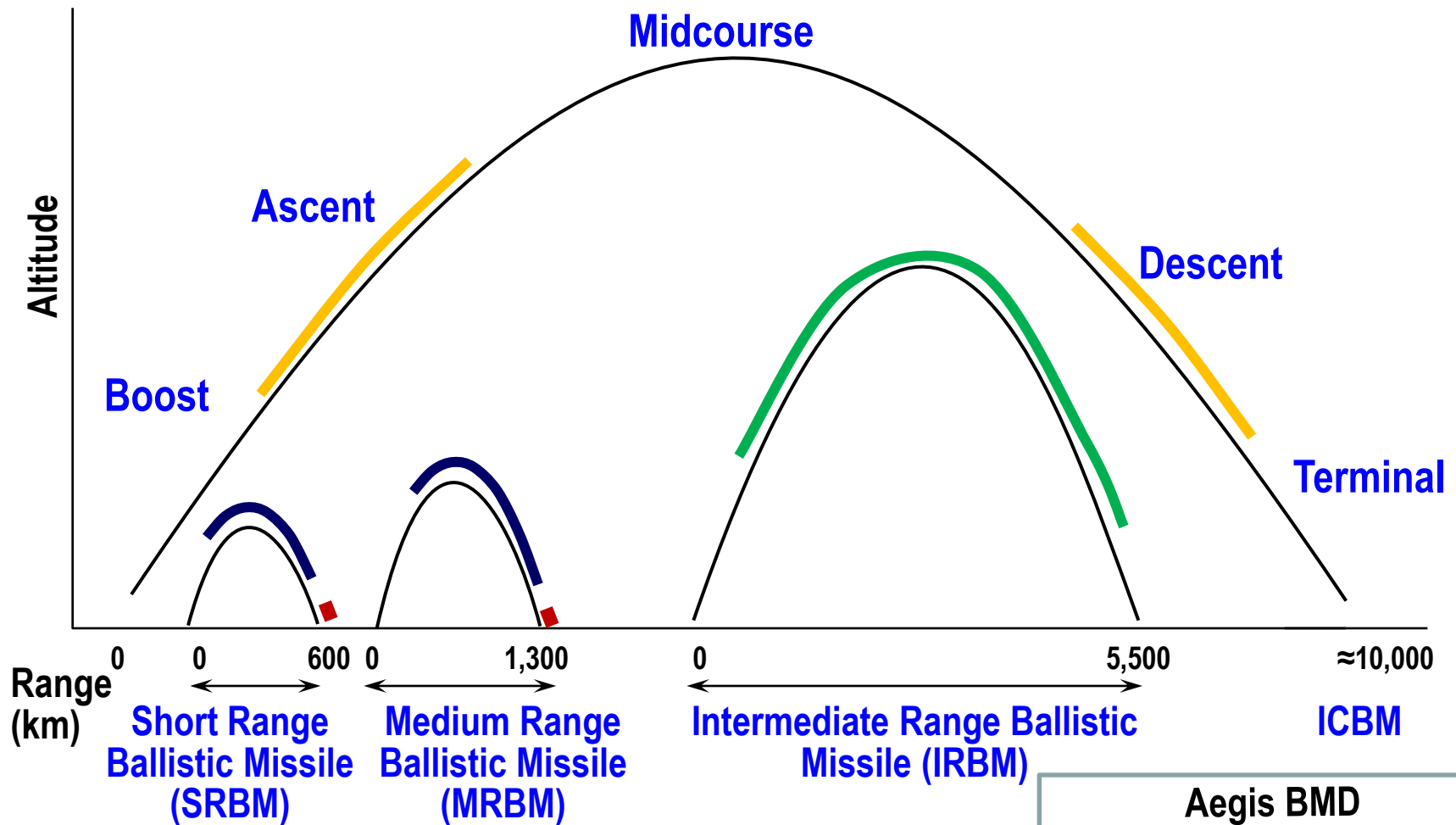
Taepo
Dong II

Increasing Numbers and Complexity

Aegis BMD SM-3 Evolution

SM-3 BLK IA	SM-3 BLK IB	SM-3 BLK IIA
<ul style="list-style-type: none"> ▪BLK IA KW <ul style="list-style-type: none"> •1-Color Seeker •Pulsed DACS 	<ul style="list-style-type: none"> ▪BLK IB KW <ul style="list-style-type: none"> •2- Color Seeker •All-Reflective Optics •Advanced Signal Processor •TDACS 	<ul style="list-style-type: none"> ▪21" Nosecone ▪Large Diameter KW <ul style="list-style-type: none"> •Adv Discrim Seeker •High Divert DACS (Design TBD)
<ul style="list-style-type: none"> ▪13.5" Propulsion <ul style="list-style-type: none"> •2nd & 3rd Stage 	<ul style="list-style-type: none"> ▪13.5" Propulsion <ul style="list-style-type: none"> •2nd & 3rd Stage 	<ul style="list-style-type: none"> ▪21" Propulsion <ul style="list-style-type: none"> •2nd & 3rd Stage
<ul style="list-style-type: none"> ▪MK 72 Booster ▪MK 41 VLS Compatible 	<ul style="list-style-type: none"> ▪MK 72 Booster ▪MK 41 VLS Compatible 	<ul style="list-style-type: none"> ▪MK 72 Booster ▪MK 41 VLS Compatible
IOC 2006	IOC 2012	IOC 2018

The Evolving Threat - BMD



Aegis BMD	
SBT	Red
SM-3 Blk IA	Dark Blue
SM-3 Blk IB, IIA	Green
SM-3 Blk IIB	Yellow

CG Modernization



Navy Precision Fires

5"/62 Gun / MK 160 GCS



Force Protection

SPQ-9B
CIWS BLK 1B

ASW

AN/SQQ-89A(V)15
Multi-Function Towed Array



ACB



ESSM

SM-6



SM-3



Improved Air and Missile Defense

Aegis Advanced Capability Build (ACB)
Cooperative Engagement Capability (CEC)
Naval Integrated Fire Control – Counter Air (NIFC-CA)
Integrated Air & Missile Defense with BMD (CGs 65-73)
SM-6 & SM-3
Evolved Sea Sparrow Missile (ESSM)

Hull, Mechanical & Electrical



All Electric



Smart Ship



MH-60R Support

DDG Modernization

Force Protection

CIWS BLK1B



Navy Precision Fires

MK 160 GCS



SM-6



SM-3



ASW

AN/SQQ-89A(V)15

Multi-Function

Towed Array



Hull, Mechanical & Electrical



Advanced Galley



Machinery
Control System



MH-60R Support

Improved Air and Missile Defense

Multi-Mission Signal Processor

Surface Electronic Warfare Improvement Program

Aegis Advanced Capability Build (ACB)

Cooperative Engagement Capability (CEC)

Naval Integrated Fire Control – Counter Air (NIFC-CA)

Integrated Air & Missile Defense with BMD

SM-6 & SM-3

Evolved Sea Sparrow Missile (ESSM)

DDG 51 Restart / Flight III

- **Flight IIA Restart**
 - New construction
 - Hulls 113-121
 - BMD capable



- **Flight III**
 - Integrated Air and Missile Defense
 - Air and Missile Defense Radar
 - Replaces CGs



Air and Missile Defense Radar



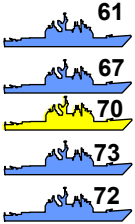


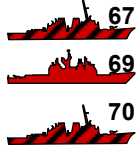

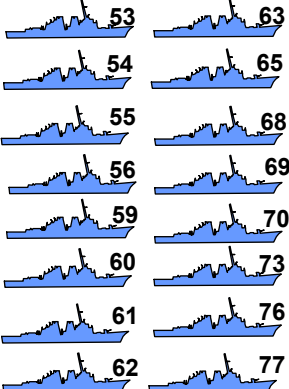
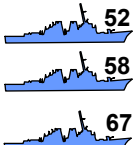
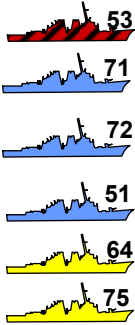
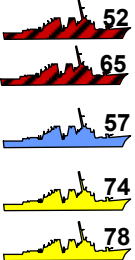
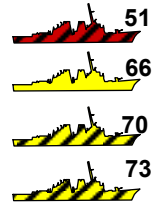


AMDR X-Band

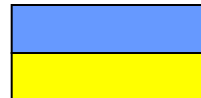
AMDR S-Band

■ AMDR:

- AMDR S-Band – volume search, tracking, Ballistic Missile Defense discrimination, missile communication
- AMDR X-Band – horizon search, tracking, missile communication, terminal illumination
- Radar Suite Controller – resource coordination between AMDR-S, AMDR-X, and combat system

PB-12 Balanced Capability & Capacity Option (BCCO)

	By 2011	FY11	FY12	FY13	FY14	FY15	FY16
CG							
DDG							
Funded Ships		24	29	32	36	38	41
Ready for Tasking		23	28	29	30	29	36



BMD 3.6.1

BMD 4.0.1



BMD 5.0

Upgrade existing capability

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Aegis Ashore

- EPAA Phase 2 BMD mission
- BMD 5.0 functionality for detection, discrimination, SM-3 engagement and control
- Aegis Weapon System (AWS) hardware and SPY-1D(V) array faces
- Vertical Launching System (VLS) with 24 SM-3 Block IB missiles; future upgrades to Block IIA and IIB



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Sea Based X-Band Radar

- Strategic asset for the homeland missile defense mission
- X-Band Radar with 45,000 transmit/receive modules and 4,800 km range, 8 knot transit speed
- Provides cued track and discrimination for the Ground Based Midcourse Defense (GMD) fire control system
- MDA transitioning responsibilities for vessel operations and sustainment to Navy
- MDA retaining responsibility for O&S of the XBR



BMDs - Ballistic Missile Defense System

Sensors



Overhead Persistent Infrared



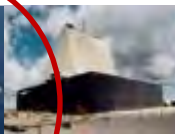
UAV Based Sensor



Precision Tracking Space System



Sea-Based Radars



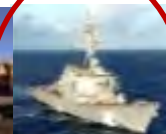
Early Warning Radar



Midcourse X-Band Radar



AN/TPY-2



SPY-1

Boost

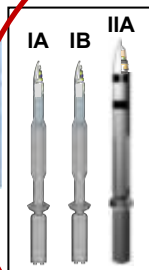
Ascent

Midcourse

Terminal



Airborne Laser (Testbed)



SM-3



Aegis BMD



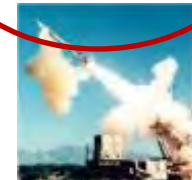
Ground-Based Midcourse Defense



Terminal High Altitude Area Defense



Sea-Based Terminal



Patriot Advanced Capability-3

Command and Control, Battle Management & Communications



NMCC STRATCOM

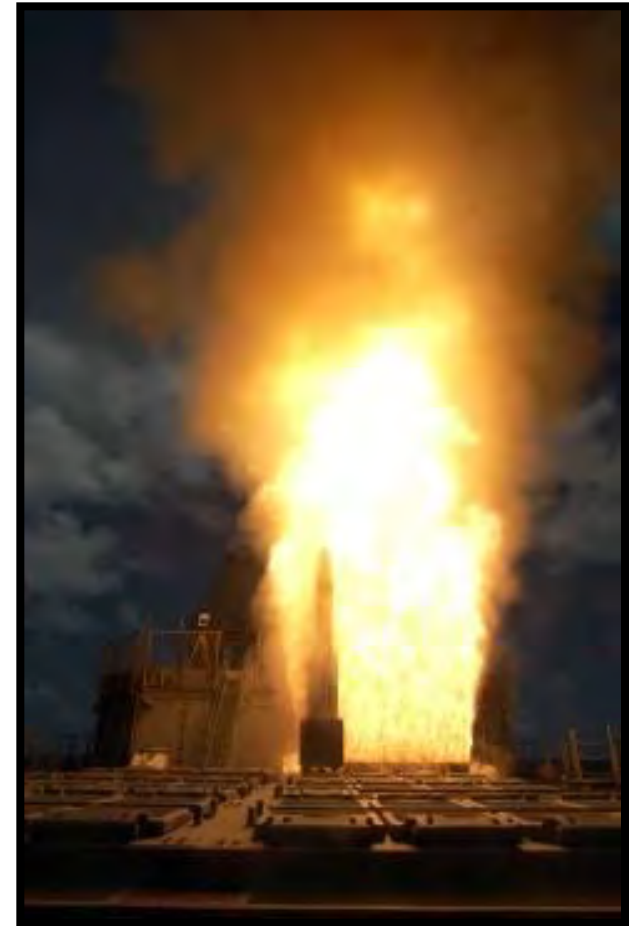
NORTHCOM

PACOM

EUCOM CENTCOM

IAMD Summary

- Evolving AAW weapons and combat systems pace littoral threat
- Fielding BMD systems to counter proliferating ballistic missiles
- Growing capability and capacity to answer COCOM demands for Navy IAMD



IAMD... Key to Assuring Access



Integrated Air and Missile Defense Symposium

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Promoting National Security Since 1919



Rear Admiral Ned Deets
Commander
Naval Network Warfare Command
14 July 2011

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What You Can Do

- Situational Awareness
- Common Operational Picture
- Automation
- Defense Beyond the Firewall
- Baselining
- Anomaly Detection
- Integration of Enterprise Network Enclaves
- Bake IA into all new PORs/Systems





Information as a Weapon

“We must maintain our preeminence in networks, intelligence, and information. There is no other Service or nation that is as good as we are.”



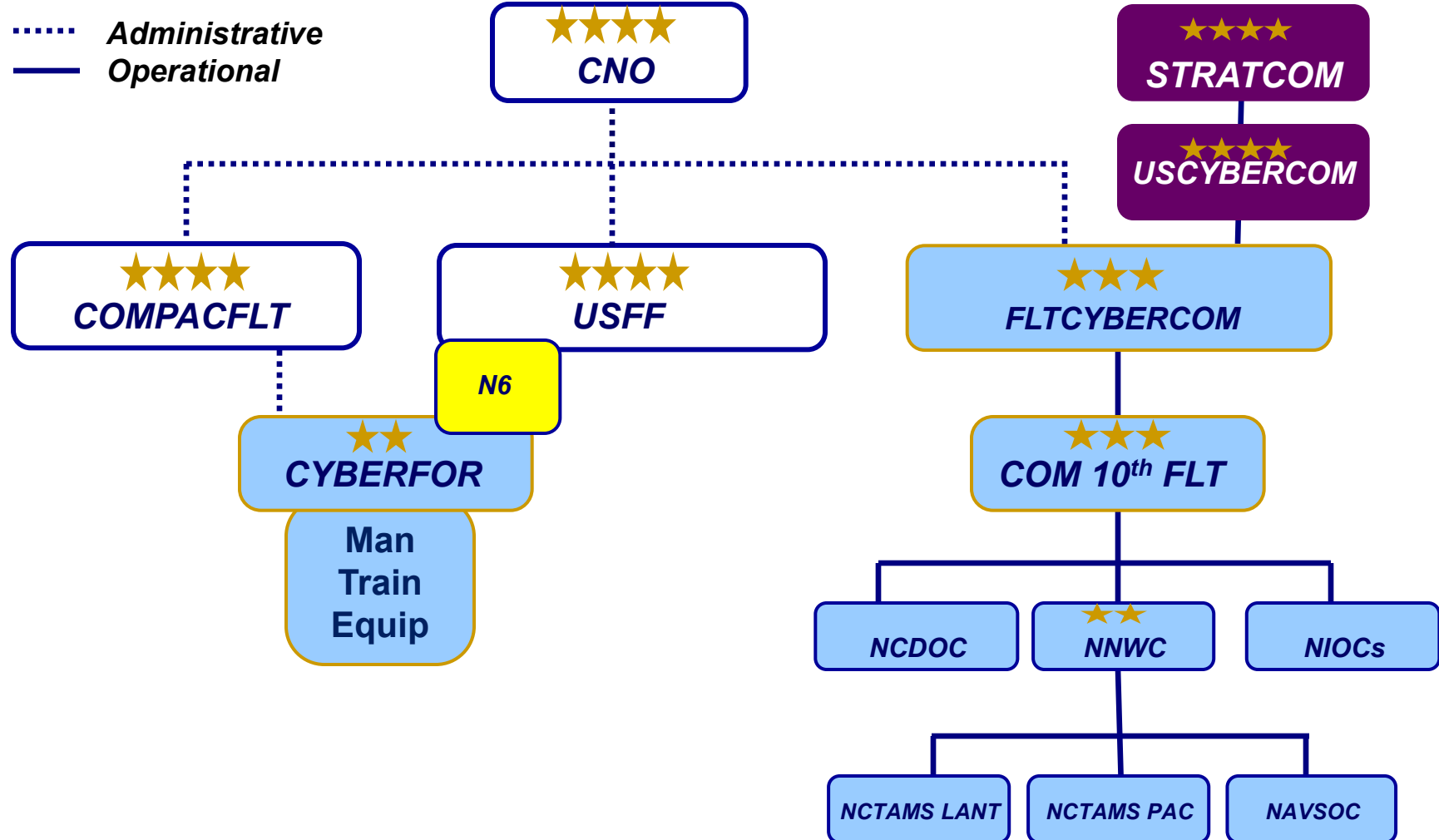
Admiral Gary Roughead
Chief of Naval Operations
17 July and 23 October 2009

***“Aligning intelligence and operations and optimizing the network in many ways takes priority over the platform.
If we don’t get the intelligence and information right, then the platform is sub-optimized.
Therefore we need to elevate the priority of information. Since we already think and operate this way, it’s time aligned organizationally to sustain it ... to achieve prominence and dominance....”***

Information becomes a main battery of the U.S. Navy; this transition to an information-centric force represents a new vision of who we are as a seapower, as a Navy, and as warfare professionals



Common Model





10th Fleet Missions and LOOs

Missions

Central operational authority for networks, cryptology/SIGINT, IO, cyber, EW and space in support of forces afloat and ashore

**Navy Component Commander to USCYBERCOM
Service Cryptologic Component Commander**



Lines of Operation

- **Assuring Navy's ability to Command and Control its operational forces in any environment**
- **Achieve and sustain the ability to navigate and maneuver freely in cyberspace and the RF spectrum**
- **On command, and in coordination with Joint and Navy commanders, conduct operations to achieve effects in and through cyberspace**



It is what it is....

- ...and it is a weapon system & all weapon systems are connected
- Non-kinetics may beat kinetics in the 21st century
- Business and admin systems have evolved into warfighting systems
- We can't function today without the Internet
 - *Our Millennials expect it*
 - *Our Millennials will use it to innovate and evolve cyber warfare*
 - *DoD users make 1 billion+ Internet connections every day*
- Convenience and security must be in balance





The Challenging Battlespace

- **Most rapidly changing battlespace**
- **More than Moore's Law**
- **The Information Battlespace is more than the networks**



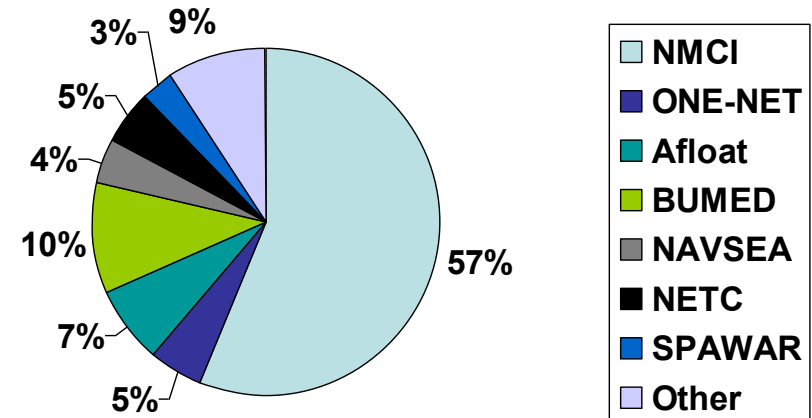


Challenge: Complex Networking Environment

- **Size --- 750,000 Users**
- **POR Vulnerabilities**
- **Reporting Processes**
- **Data Capture**
- **Data Visibility**
- **System Diversity**
- **Security**
- *Compatibility*
- *Platform centric acquisition*
- *Program alignment*
- *Install timelines*
- *Environment*
- *Training*
- *Finite manpower/Infinite demands*
- *Bandwidth-data choke point*
- *Life cycle costs*

Enterprise 62%

NIPR*

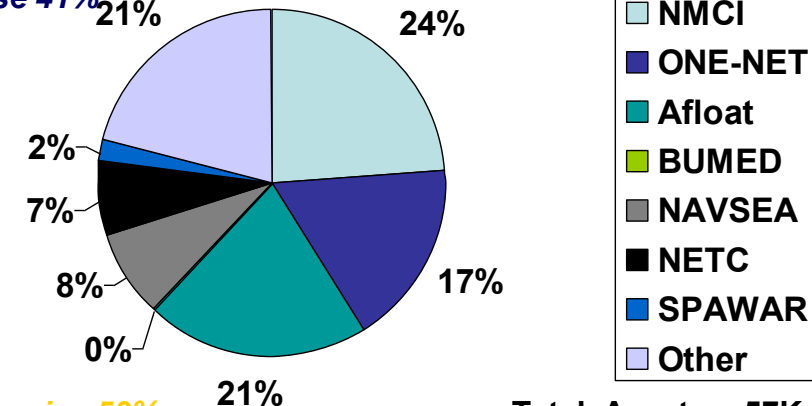


Non-Enterprise 38%

Total Assets ~ 448K

SIPR*

Enterprise 41%



Non-Enterprise 59%

Total Assets ~ 57K

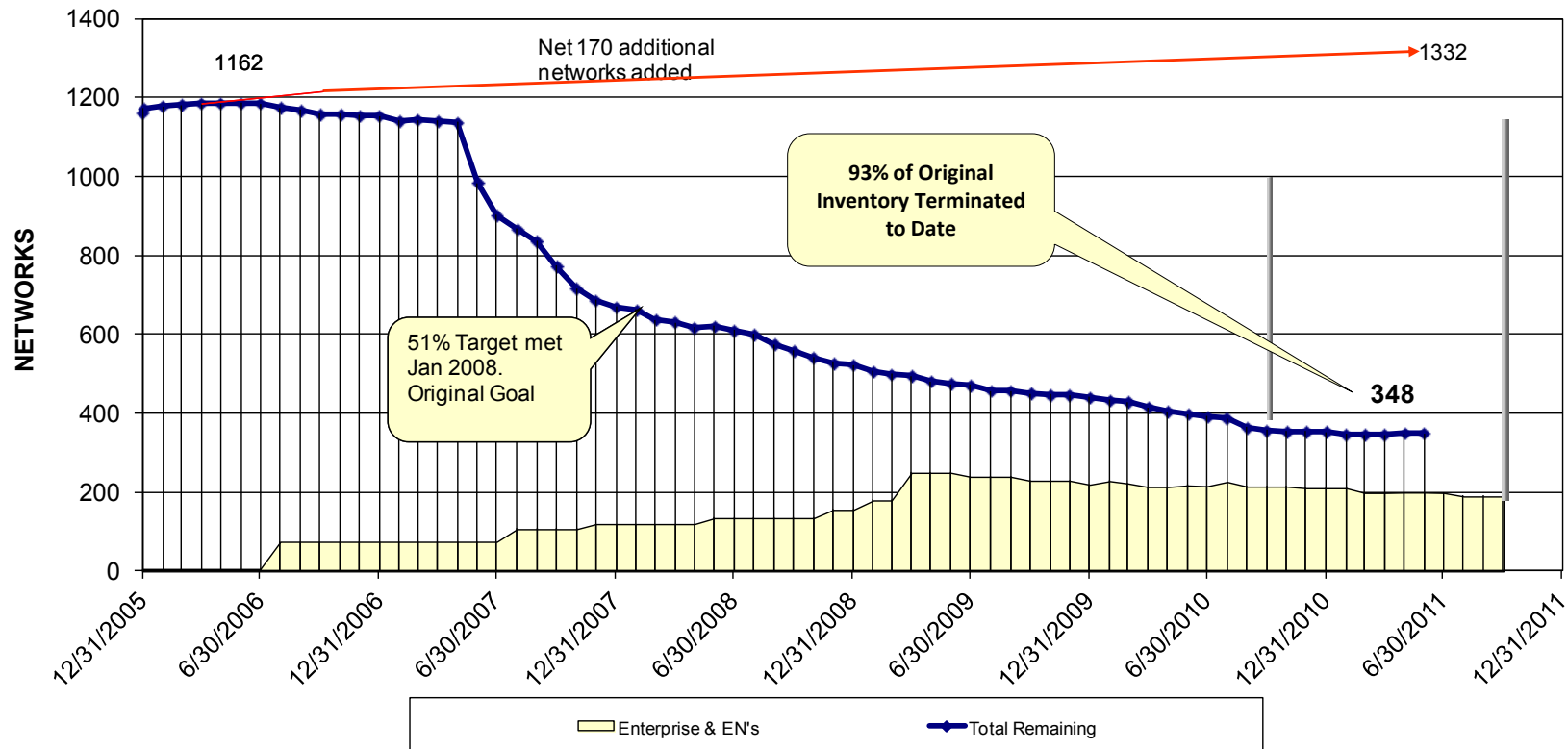
* As of 1 Mar 11



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Cyber Asset Reduction and Security (CARS) Achievements



Initial Goal: Reduce Network Portfolio by 51%

Network Reductions: 984

Server Reductions: 19,477

Device Reductions: 32,208

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Challenge: The Threat

CNN.com/technology

Chinese hackers: No site is safe

- Chinese hackers claim to have broken into Pentagon's system
- The hackers met with CNN on an island near a Chinese naval hub
- Hackers say Beijing secretly pays them at times, something the government denies
- Official: "The Chinese government does not do such a thing"



- Hackers
- Disgruntled Insiders
- Industrial Espionage
- Foreign Espionage
- Terrorists
- State Sponsored Attacks

Guardian Unlimited

Russia accused of unleashing cyberwar to disable Estonia

- Parliament, ministries, banks, media targeted
- NATO experts sent in to strengthen defenses



Verizon Data Breach Study

How do breaches occur?

“Due to the lower proportion of internal threat agents, “Misuse” lost its pole position among the list of threat action categories. Hacking and Malware have retaken the lead and are playing dirtier than ever. Absent, weak, and stolen credentials are careening out of control. Gaining quickly... - Physical.”

- 50%** - Utilized some form of hacking (+10%)
- 49%** - Incorporated malware (+11%)
- 29%** - Involved physical attacks (+14%)
- 17%** - Resulted from privilege misuse (-31%)
- 11%** - Employed social tactics (-17%)

Source

**2011 Data Breach
Investigations Report**



What commonalities exist?

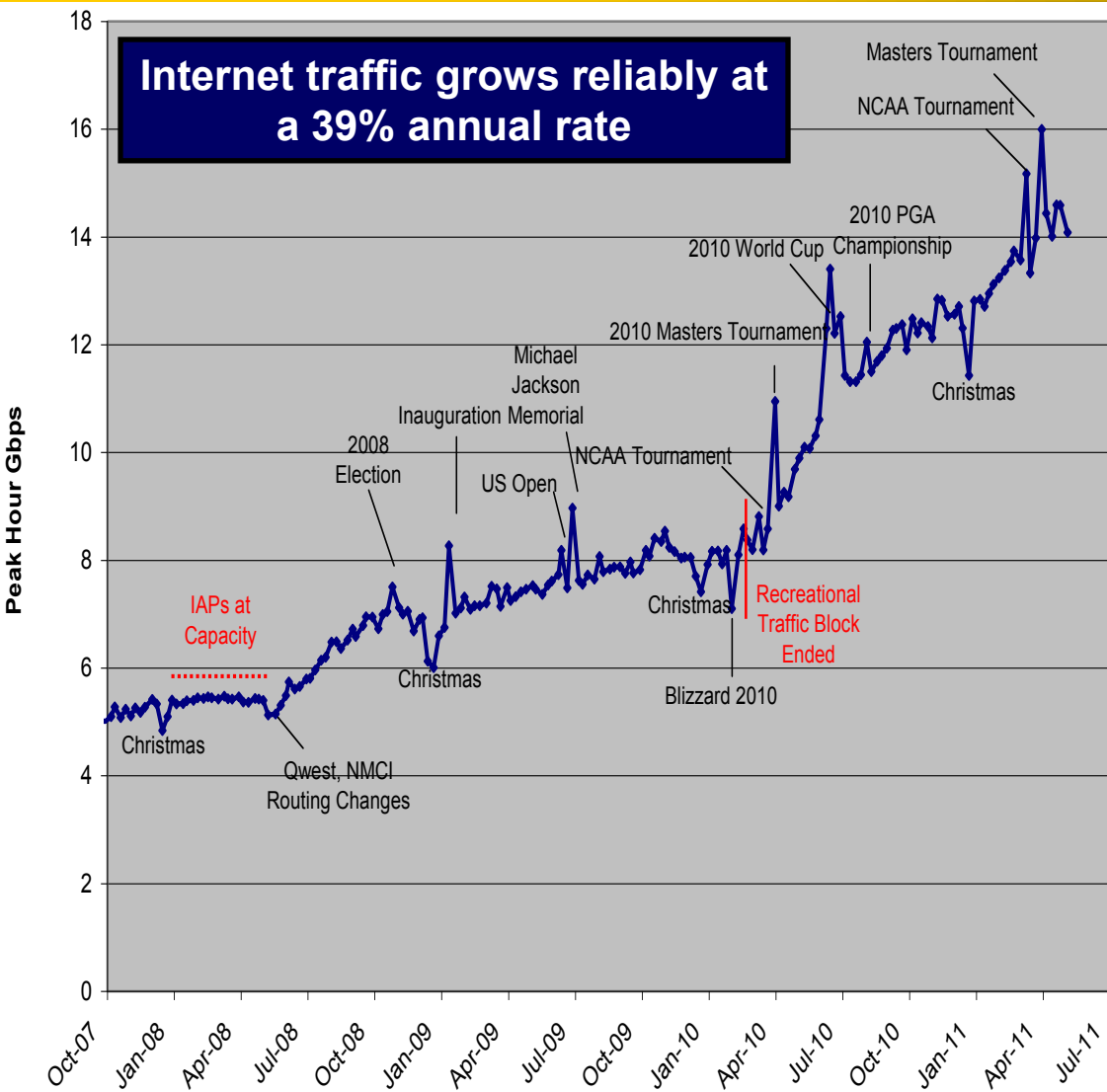
“Breaching organizations still doesn't typically require highly sophisticated attacks, most victims are a target of opportunity rather than choice, the majority of data is stolen from servers, victims usually don't know about their breach until a third party notifies them, and almost all breaches are avoidable (at least in hindsight) without difficult or expensive corrective action. “

- 83%** of victims were targets of opportunity (+0)
- 92%** of attacks were not highly difficult (+7%)
- 76%** of all data was compromised from servers (-22%)
- 86%** were discovered by a third party (+25%)
- 96%** of breaches were avoidable (+0)

*A study conducted by the Verizon RISK Team with
cooperation from
the U.S. Secret Service and the Dutch High Tech Crime Unit*



Challenge: Exposure



Top 20 Sites Visited by Navy Users (May 2011)

Domain	Description
1 google.com (High BW)	YouTube and Google Video
2 google.com (Low BW)	Search, Email and Maps
3 pandora.com	Internet Radio
4 streamtheworld.com	Streaming Radio (Including CBS Radio)
5 facebook.com	Social Networking
6 yahoo.com	Search Engine, Portal, News, Personal E-
7 amazon.com	Shopping
8 wordpress.com	Blog Hosting
9 microsoft.com	Software and Software Updates
10 CNN	News
11 verisign.com	PKI and Encryption
12 msn.com	News, Portal
13 live365.com	Internet Radio
14 craigslist.org	Shopping
15 ebay.com	Online Auctions, Shopping
16 windowsupdate.com	Software Updates
17 blackboard.com	Educational Software
18 usmc-mccs.org	Marine Corps Community Services
19 wikipedia.org	Reference
20 navyfcu.org	Banking/Financial



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Challenge: Risk Assessment



UNCL



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Social Networking -What's the Risk?



Risk is acknowledged

“So we’ve joined that conversation.....

We’re burning the boats. There’s no going back. We’re committed irreversibly (to Social Networking).”

CNO Roughead (May 2011)



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Accountability for Network Security

COMUSFLTFORCOM 261555Z May 09

(U) LET ME BE CLEAR. IT IS YOUR RESPONSIBILITY TO PROTECT YOUR NETWORK AND PRECLUDE THIS SORT OF ACTIVITY. DOD AND NAVY POLICY EXPRESSLY PROHIBIT THE USE OF THUMB DRIVES ON DOD COMPUTERS. IPODS, PERSONAL BLACKBERRIES, AND CELL PHONES ARE STORAGE DEVICES AND MAY NOT BE PLUGGED INTO A NAVY COMPUTER, EVEN FOR CHARGING. THESE STORAGE DEVICES CAN CARRY MALWARE AND SPREAD INFECTIONS.



**Admiral Jonathon W. Greenert
Commander
U.S. Fleet Forces
Sep 07 – Jul 09**

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The Three C's

- **Culture**

- Accountability
- Commander's "Daily View"
- Damage Control, Force Protection
- Warfare Area

- **Conduct**

- C2
- Inspection Mentality
- Operational Reporting
- Physical Security
- Warfighting, Not Support

- **Capability**

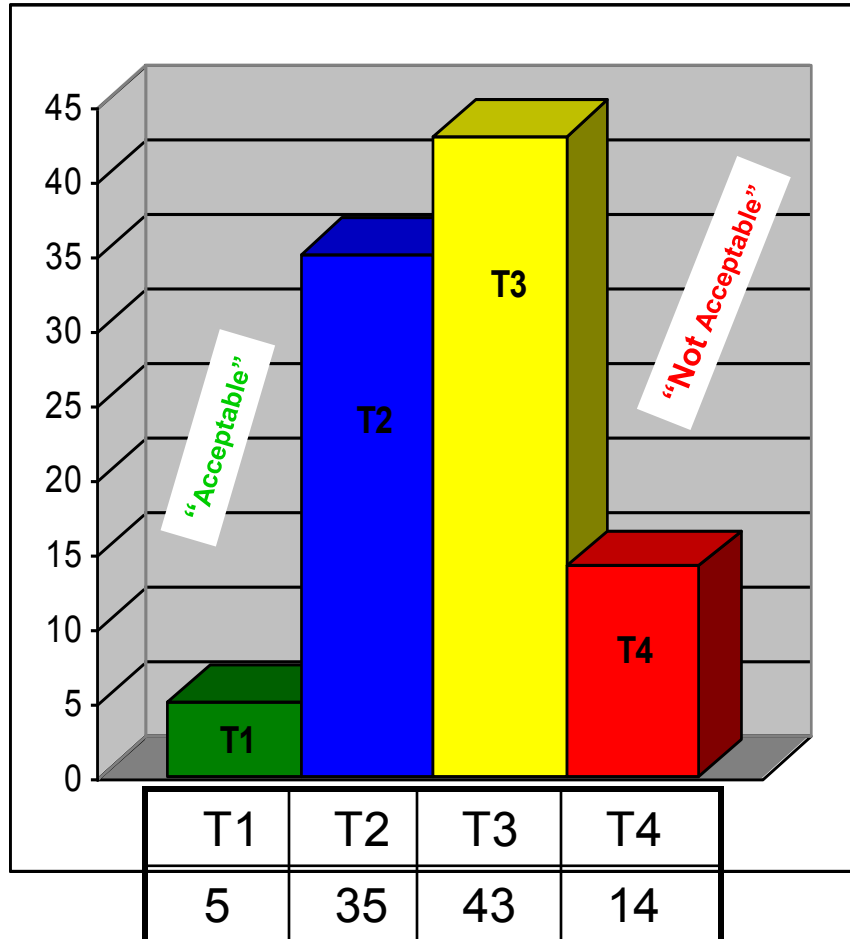
- Automation
- Situational Awareness
- Proactive Defense
- Training from SN to ADM





Afloat Assessment Breakdown

Culture Conduct Capability

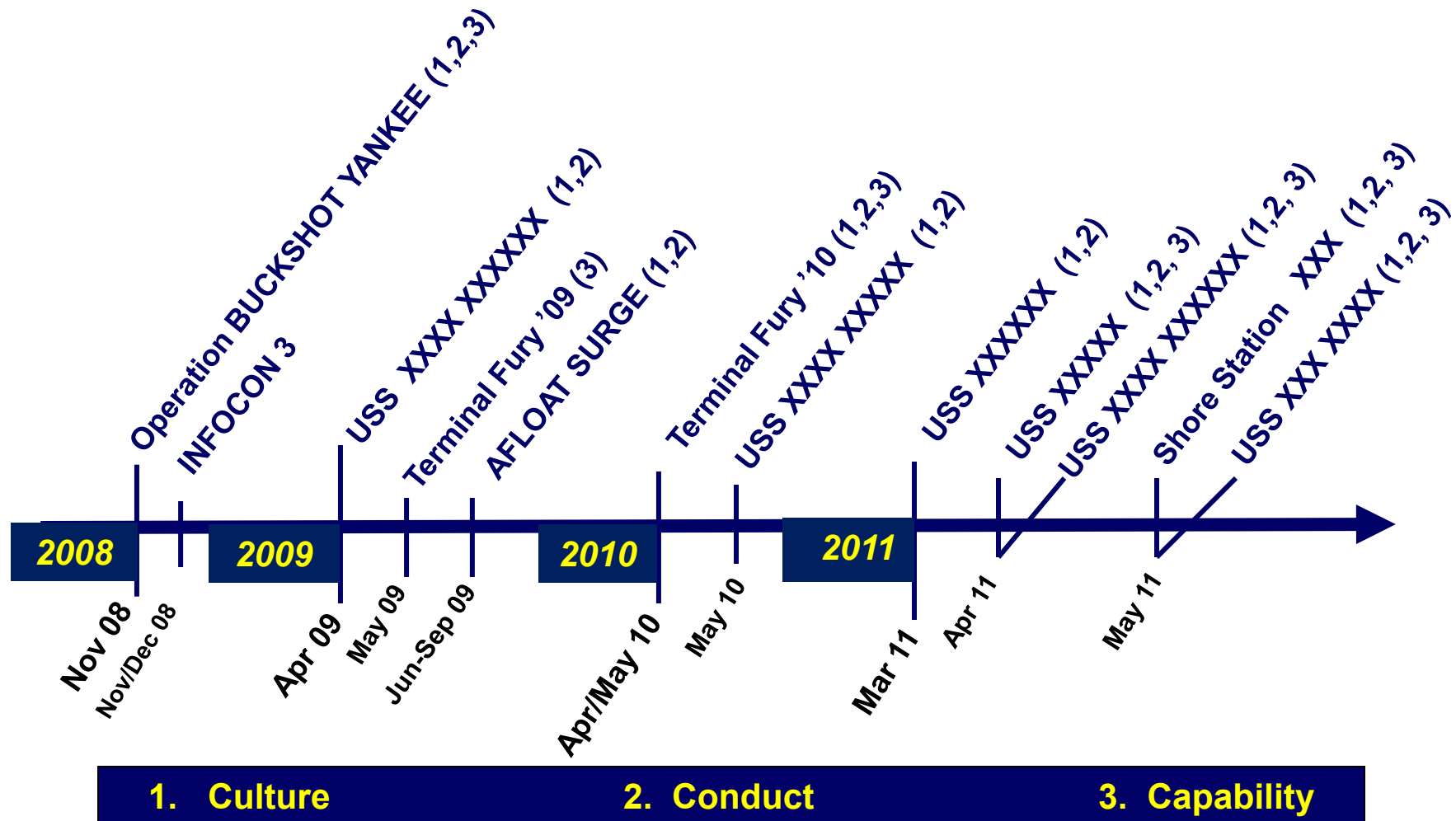


Findings

- USB Devices (Conduct)
- Patches (Conduct, Capability)
- Malware (Conduct, Capability)
- Unauthorized Software (Culture, Conduct)
- Root Level Access (Culture, Conduct)
- Weak / No Access Control Lists (Culture, Conduct)
- Unnecessary Open Ports (Conduct, Capability)
- Weak / Default Passwords (Culture, Conduct)

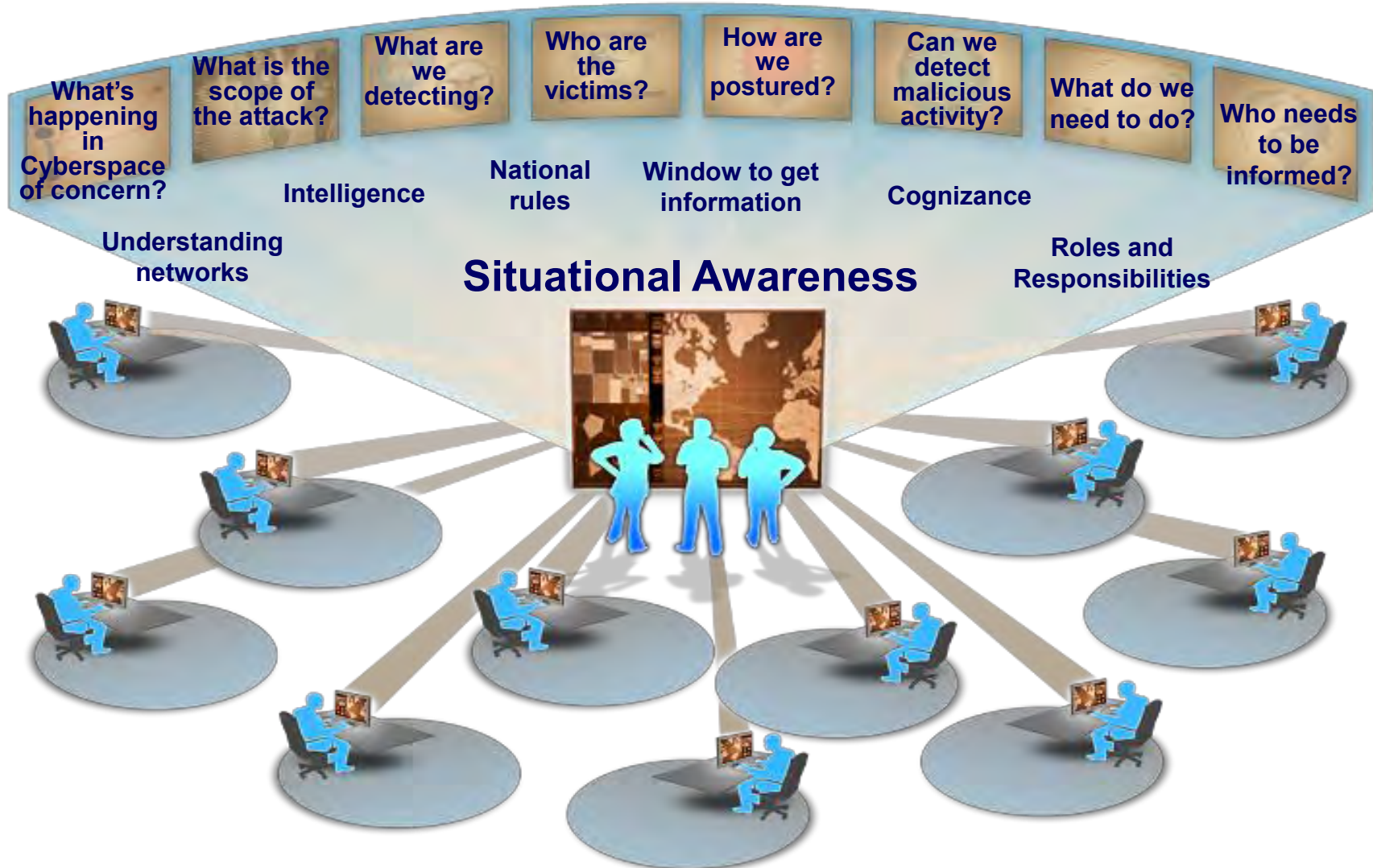


Challenge Continuum





The Cyber COP





Inspections Situational Awareness

**COMFLT CYBERCOM
FT GEORGE G MEADE MD
282138Z JAN 11**



***“A COORDINATED COMPACTFLT, USFF,
AND COMFLT CYBERCOM MESSAGE.***

***IMPLEMENT CNO DIRECTED CYBER
SECURITY INSPECTION AND
CERTIFICATION PROGRAM (CSICP).”***

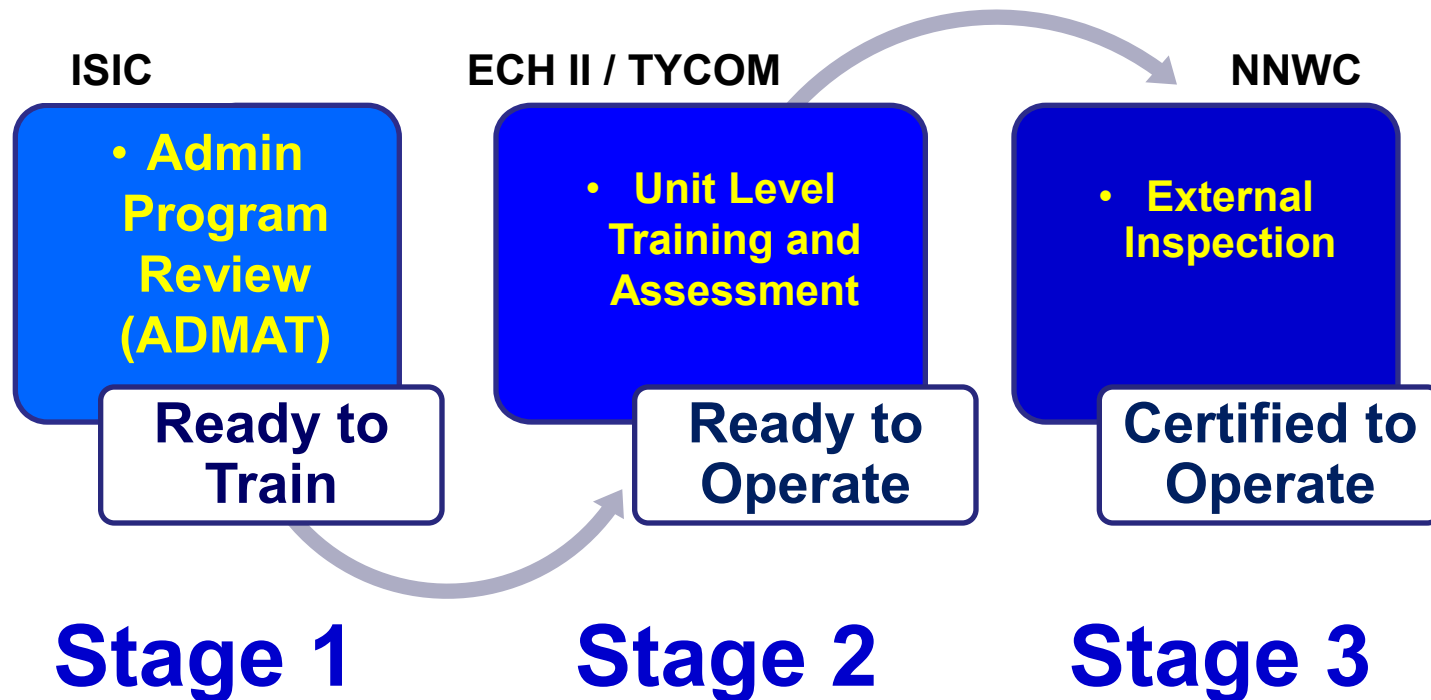
***“THE PROGRAM WILL ENSURE HEALTH
AND SECURITY OF NAVY NETWORKS
AND CONNECTED COMBAT SYSTEMS.”***

***“NAVY NETWORKS ARE A COMBAT
SYSTEM AND WILL ADHERE TO THE
SAME INSPECTION AND CERTIFICATION
RIGOR AS ALL OTHER COMBAT
SYSTEMS.”***



CSICP Cycle

The Vision : Three year cycle tied to Network Authority to Operate (ATO) process with an annual drumbeat...





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Achieving C2

Network Command & Control (C2) is the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Network C2 functions are executed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Situational awareness is implicit within C2 since it is not possible to appropriately exercise C2 without an understanding of the status of assigned forces.

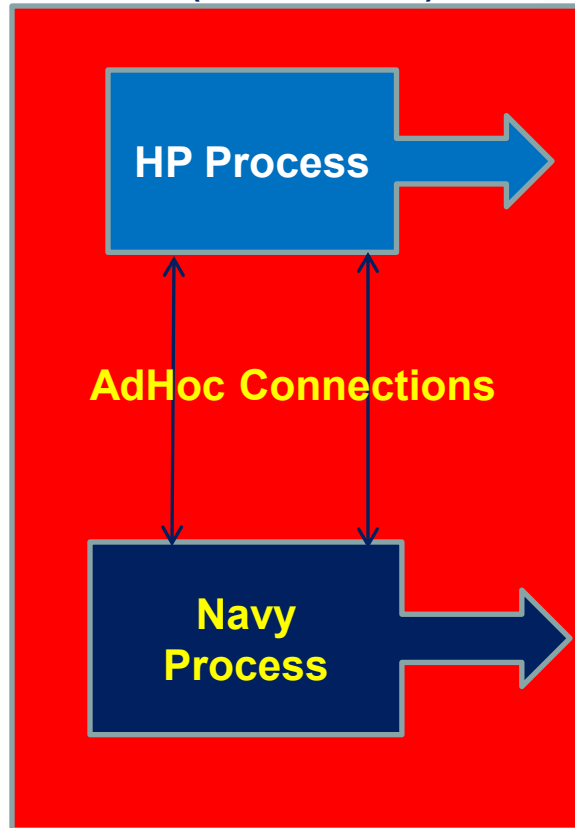


Largest, Most Mature Network Forcing Function for Achieving C2 of all Navy Networks

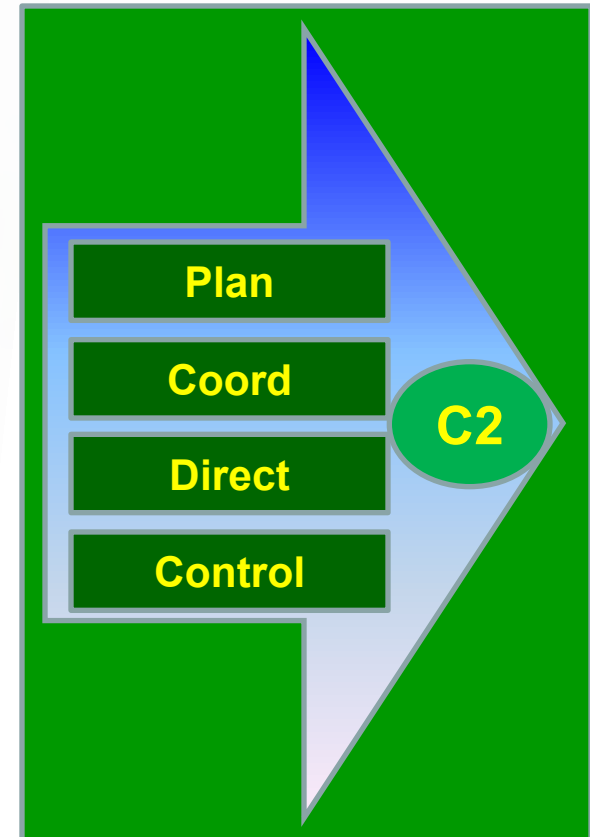


Command and Control (C2)

Adhoc Processes (Prior to 2011)



Merged Processes For C2 of all Navy Networks



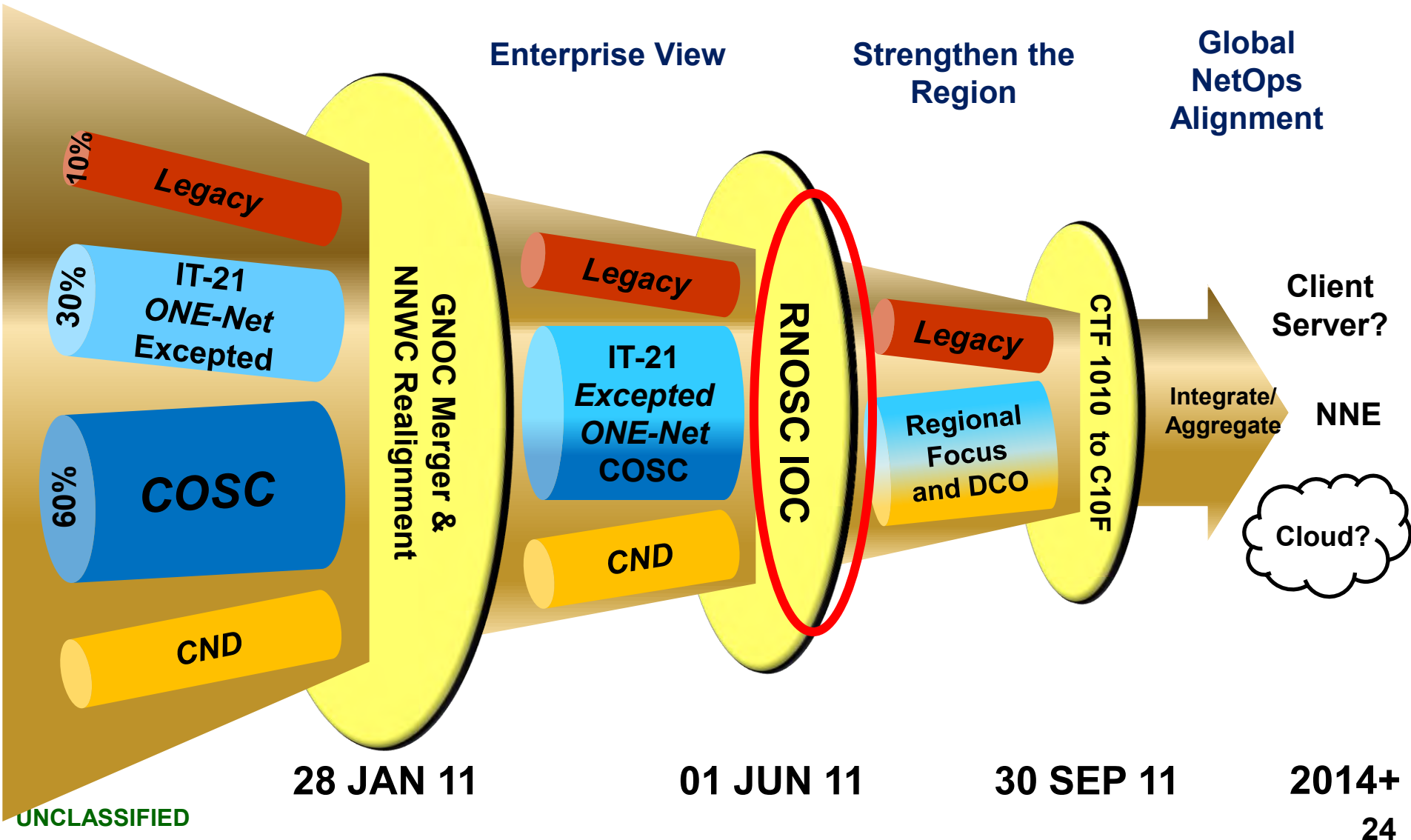
Network Command and Control = Shared Situational Awareness and Unified C2



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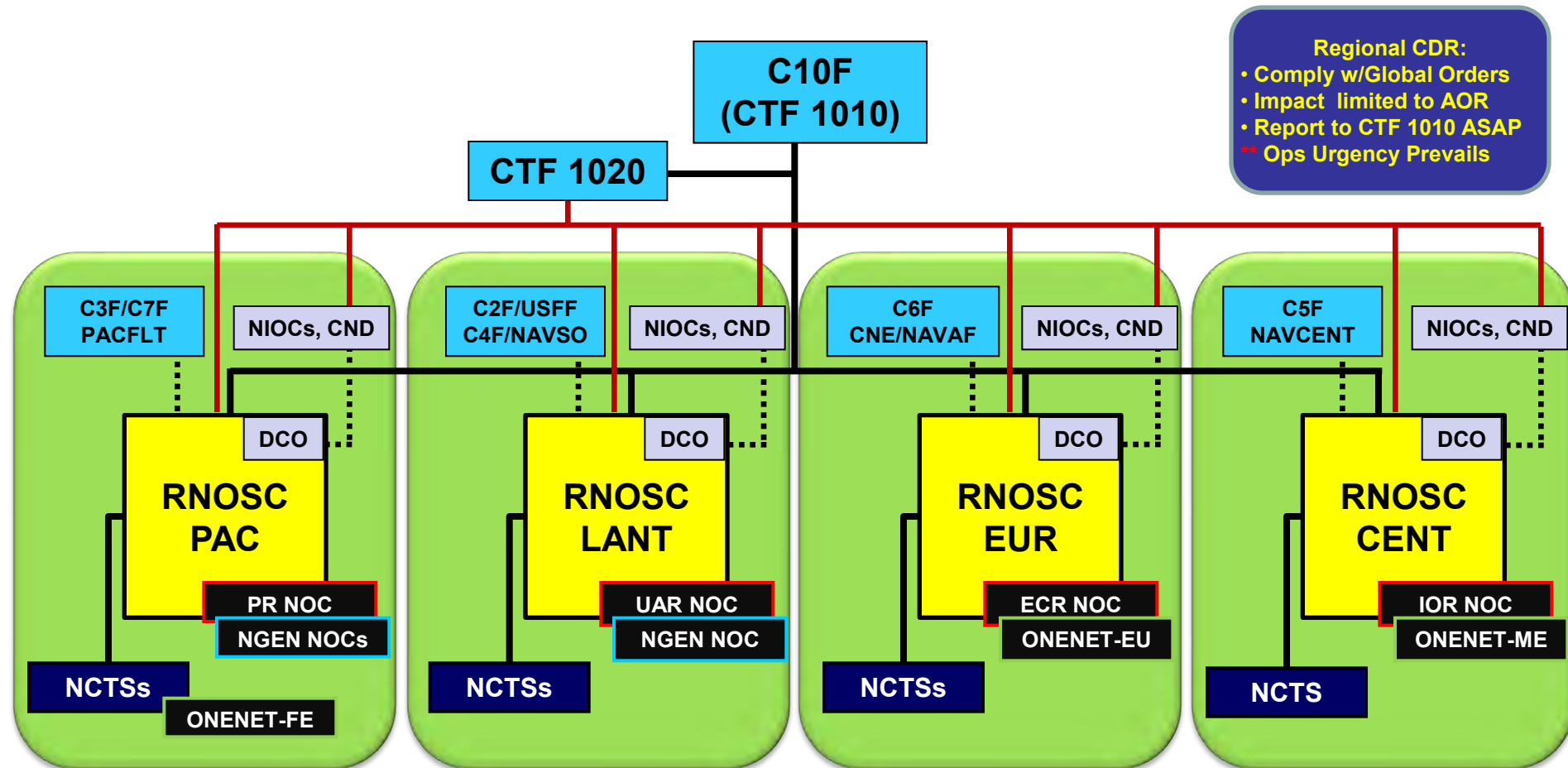
Operational Alignment For C2





Regional Network Operations and Security Command (RNOSC) C2

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— Command – lawful command authority over subordinates by assignment or rank
 — Control – non-command authority exercised over activities of organizations
 Coordinate – delegated authority for coordinating specific functions or activities

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What You Can Do

- Situational Awareness
- Common Operational Picture
- Automation
- Defense Beyond the Firewall
- Baselining
- Anomaly Detection
- Integration of Enterprise Network Enclaves
- Bake IA into all new PORs/Systems



Questions?

RADM Ned Deets

Edward.Deets@navy.mil

(757) 417-6700

AEGIS BALLISTIC MISSILE DEFENSE



*Aegis BMD Update to the
National Defense Industrial Association &
Strike, Land Attack, and Air Defense Division
14 July 2011*



Purpose

Aegis BMD

Aegis Ballistic Missile Defense Update with Insight into the State of the European Phased Adaptive Approach and Aegis Ashore



U.S. Phased Adaptive Approach Contributes To NATO Missile Defense

Aegis BMD

Phase 1 (By 2011)

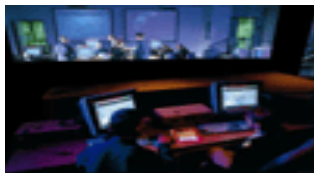
Initial capability against
SRBMs, MRBMs, and IRBMs,
enhanced homeland defense



Aegis BMD 3.6.1 with SM-3 IA



AN/TPY-2 (FBM)

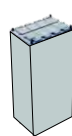


C2BMC AOC
Ramstein

ALTBMID Interim Capability

Phase 2 (By 2015)

Robust capability against
SRBMs and MRBMs



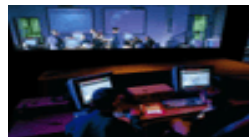
Aegis Ashore 5.0
with SM-3 IB
(one site)



Aegis BMD 4.0.1/5.0
with SM-3 IB



AN/TPY-2 (FBM)



C2BMC Updates

ALTBMID Lower Tier

Potential EPAA
Enhancements



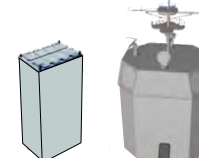
THAAD

Phase 3 (By 2018)

Robust capability against
IRBMs



Aegis BMD 5.1
with SM-3 IIA



Aegis Ashore 5.1
with SM-3 IB/IIA
(two sites)



AN/TPY-2 (FBM)



C2BMC Updates

ALTBMID Upper Tier

Potential EPAA
Enhancements



THAAD



PTSS



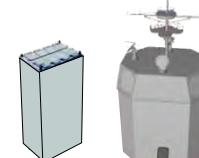
ABIR

Phase 4 (By 2020)

Early intercept capability against
MRBMs and IRBMs; and ICBMs
from today's regional threats



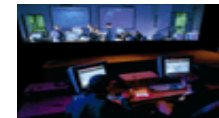
Aegis BMD 5.1
with SM-3 IIA



Aegis Ashore 5.1
with SM-3 IIB
(two sites)



AN/TPY-2 (FBM)



Enhanced C2BMC

Potential EPAA
Enhancements



THAAD



PTSS



ABIR



Aegis BMD Program

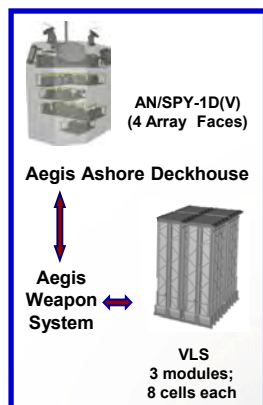
Aegis BMD

Autonomous (2004)

Launch on Remote (Ship to Ship) 2006

Launch on Remote (BMD Sensors) 2008

Engage on Remote

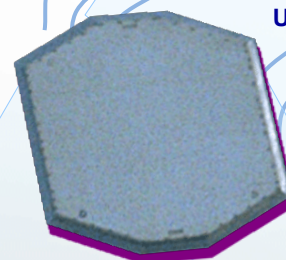


Aegis Ashore 2015
Hawaii Test Site 2013

**Open
Architecture 2012**



**Aegis Ballistic Missile Defense
Signal Processor (BSP)
Upgrade 2010 (Testing)**



**Radar System
AN/SPY-1**

SM-3



Blk I / IA / IB
2004/2006/2013



Blk IIA
2018



Blk IIB
2020

**Sea-Based
Terminal**



SM-2
Blk IV
2008
Near
Term
✓



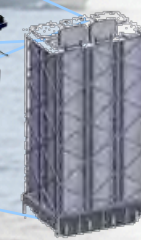
SM-6
Missile
2015
Incr 1



SM-6
Missile
2018
Incr 2



**Vertical
Launching
System Mark 41**



**SM-3 Blk IIB
VLS Concept**



Aegis BMD's Role In The BMDS

Aegis BMD

**Ascent/Midcourse
Engagement
Capability
Defeats Short,
Medium &
Intermediate
Range Ballistic
Missiles**

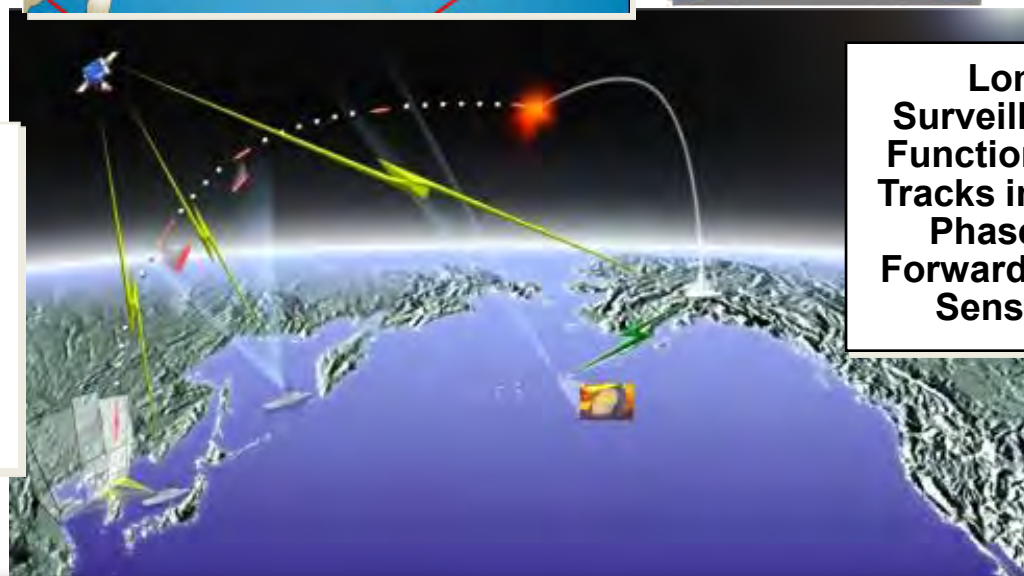


**Terminal Defense
Capability Defeats
Shorter Range Ballistic
Missiles**



**Future
Adding Early
Intercept
Capability**

**Anti-ICBM
w/SM-3 Blk IIB
(Aegis Ashore)**



**Long Range
Surveillance & Track
Function Detects and
Tracks in Early Ascent
Phase Providing
Forward Based BMDS
Sensor Support**

Proven Against Single Salvo, Dual Salvo & Separating Targets



Aegis BMD Fleet Today

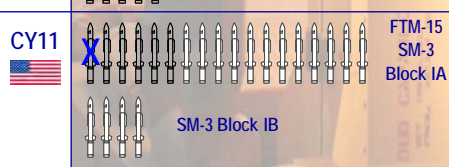
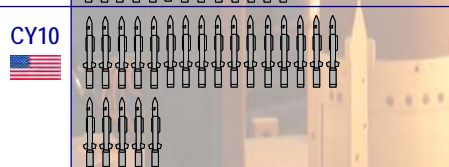
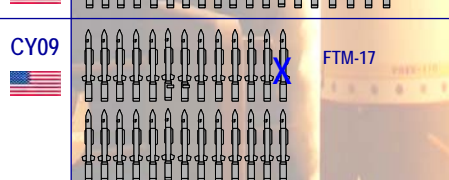
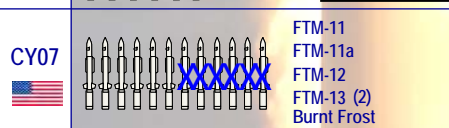
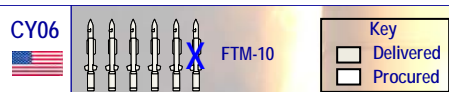
(July 2011)

Aegis BMD

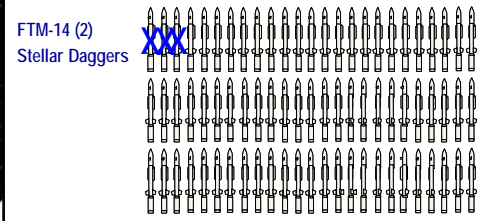
SM-3 Bk I Deliveries



SM-3 Bk IA Deliveries



SM-2 Bk IV Deliveries (75)



Norfolk BMD Ships

VELLA GULF
MONTEREY
RAMAGE
STOUT
*COLE
*LABOON

BARRY (FY11)
MAHAN (FY12)
ROSS (FY12)
ARLEIGH BURKE (FY12)
DONALD COOK (FY12)

SDGO BMD Ships

DECATUR
BENFOLD
MILIUS
HIGGINS
JOHN PAUL JONES

Mayport Based BMD Ship
THE SULLIVANS
CARNEY (FY12)

Japan Maritime Self Defense Force

KONGO
CHOKAI
MYOKO
KIRISHIMA

YOKO BMD Ships

SHILOH
STETHEM
CURTIS WILBUR
JOHN S. MCCAIN
FITZGERALD

PHBR BMD Ships

LAKE ERIE (4.0.1 EDM)
PORT ROYAL
RUSSELL
O'KANE
PAUL HAMILTON
HOPPER

* Not Yet Certified



EPAA Phase I: USS MONTEREY Deploys to Mediterranean Sea

Aegis BMD

- **First PAA Phase I Deployment**
 - Arrived on station 5 April 2011; assigned Ballistic Missile Defense as Primary Mission
 - Seven Month Deployment
 - Port Visit in Constanta, Romania 06-09 June 2011



- **USS MONTEREY has:**
 - Been on station 101 days as the ATLANTIC Sentry Unit
 - Updated and refined PAA related tactics, techniques and procedures
 - Hosted a Reception and Ship Tours with Teodor Baconschi, Minister of Foreign Affairs; Mircea Geoana, President of the Senate

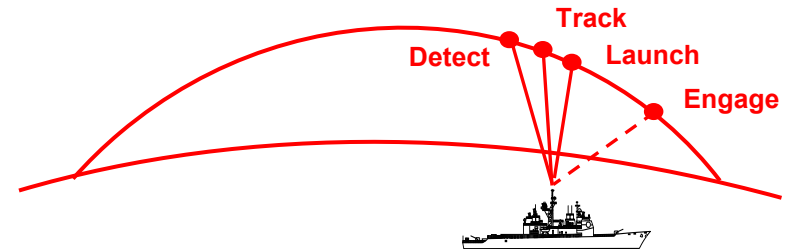


Aegis BMD Concepts of Operation

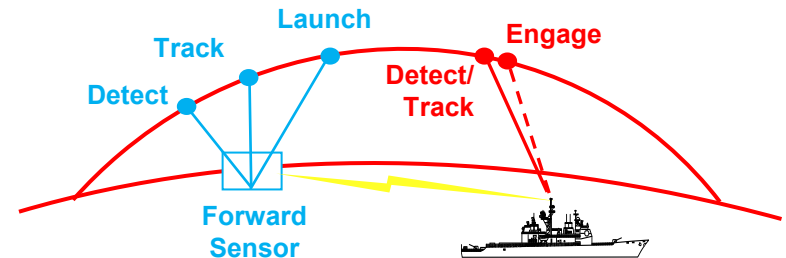
Exploiting Off Board Sensors

Aegis BMD

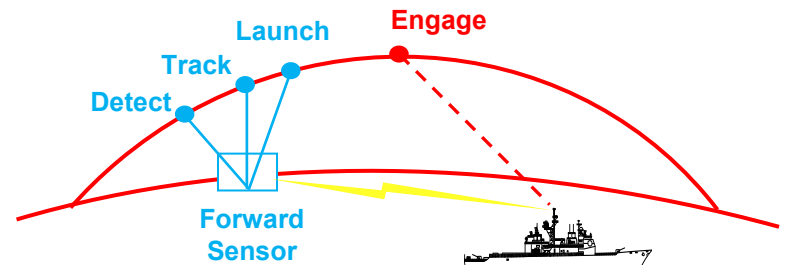
Autonomous Cued



Launch on Remote



Engage on Remote





Aegis BMD Firing Operations

Aegis BMD

Foreign Military Sales

17 Dec 07
JFTM 1



- First Firing from Japanese Destroyer

19 Nov 08
JFTM 2



- First Japanese No-Notice Launch
- Separating Target

27 Oct 09
JFTM 3



- Engage Separating Warhead with SM-3 Blk IA

28 Oct 2010
JFTM 4



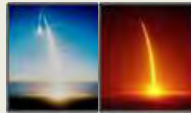
- Final JFTM engagement of a separating warhead with SM-3 Blk IA

Homeland Defense

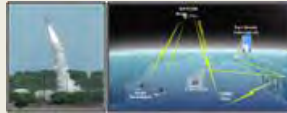
GT-180
Glory Boost



IFT-9/10



PAC EX I, II, III, & IV



First ICBM Tracking: 19 Sep 02

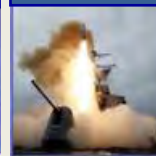
Terminal Defense

5 June 08
FTM 14



- Engage SRBM w/ SM-2 Blk IV

26 Mar 09
Stellar Daggers



- Simultaneous BMD/ AAW Engagement



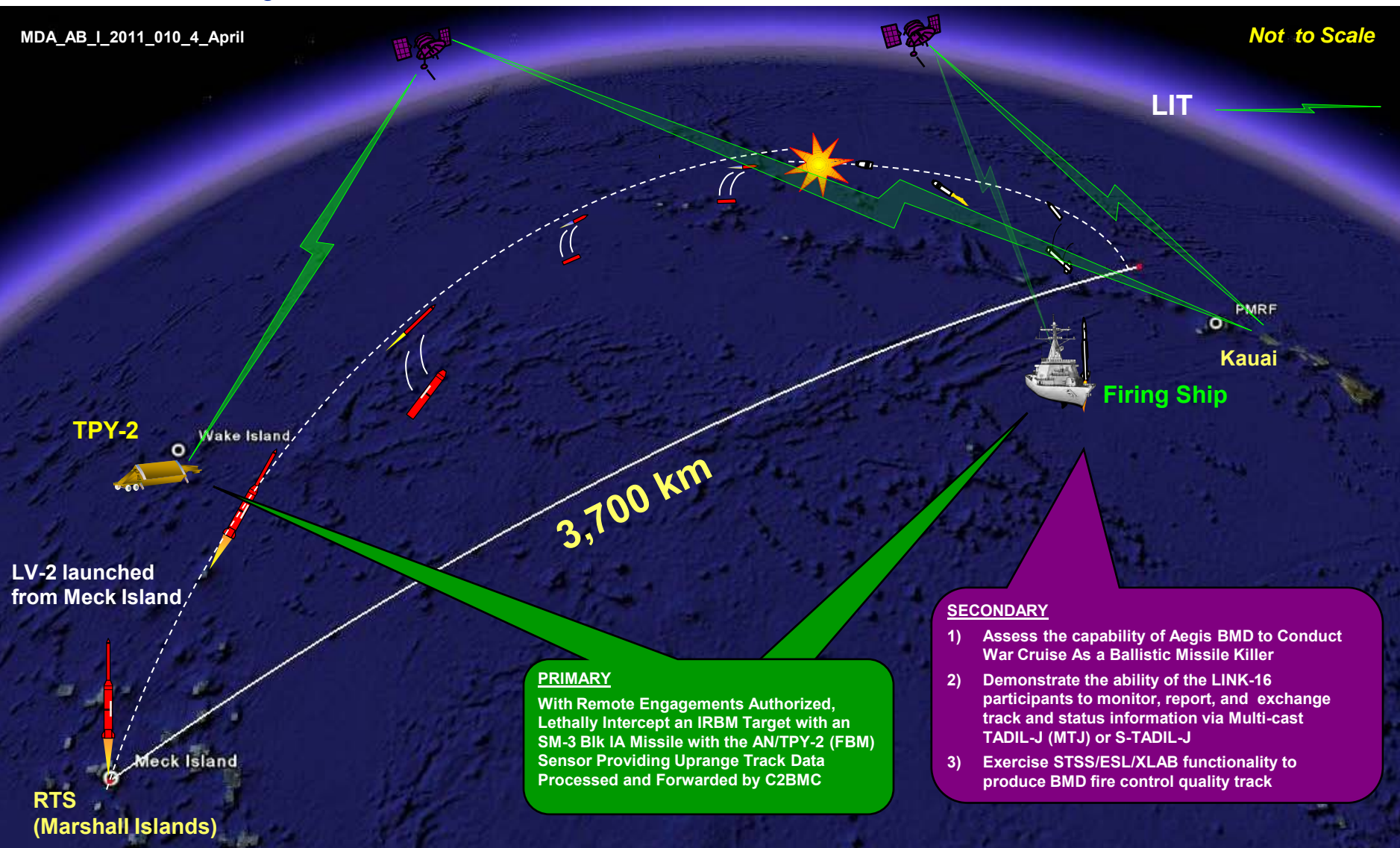


FTM-15 Mission Scenario and Objectives

Aegis BMD

MDA_AB_I_2011_010_4_April

Not to Scale

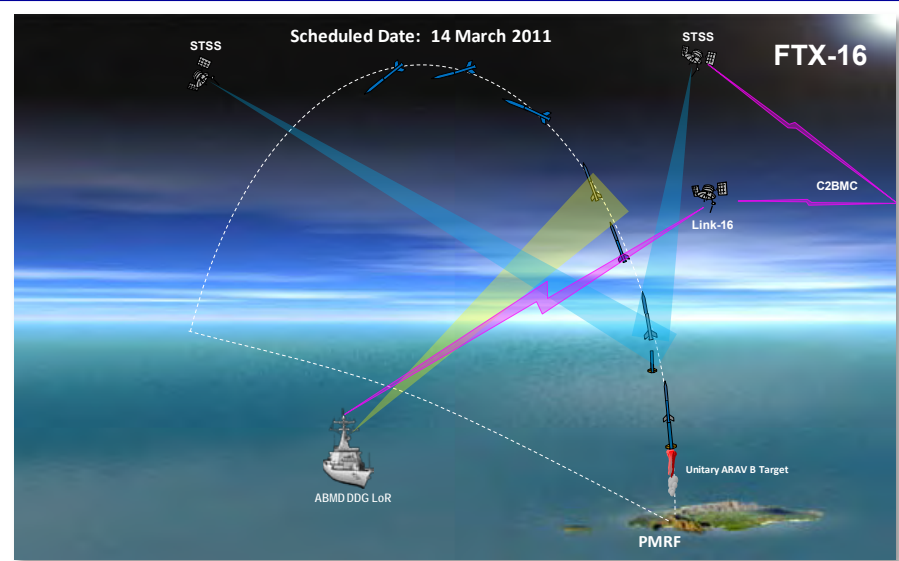
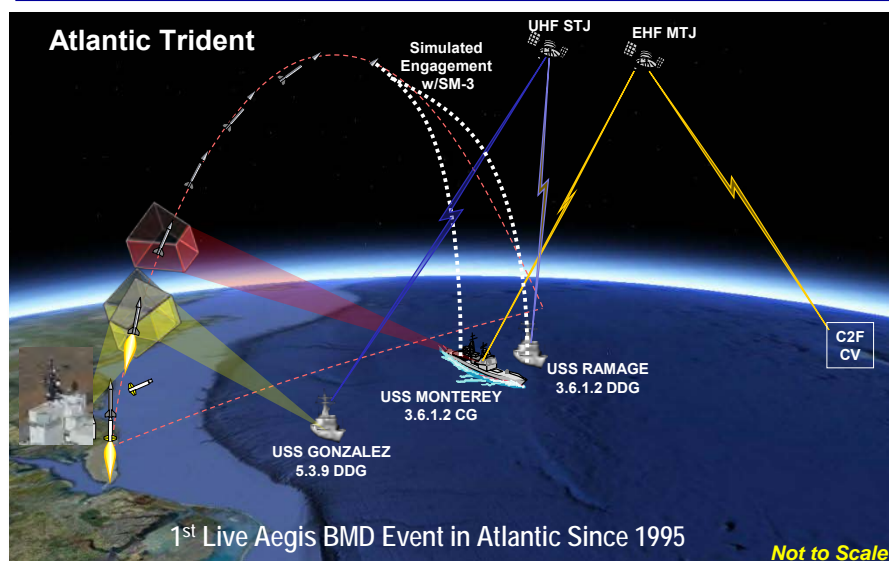
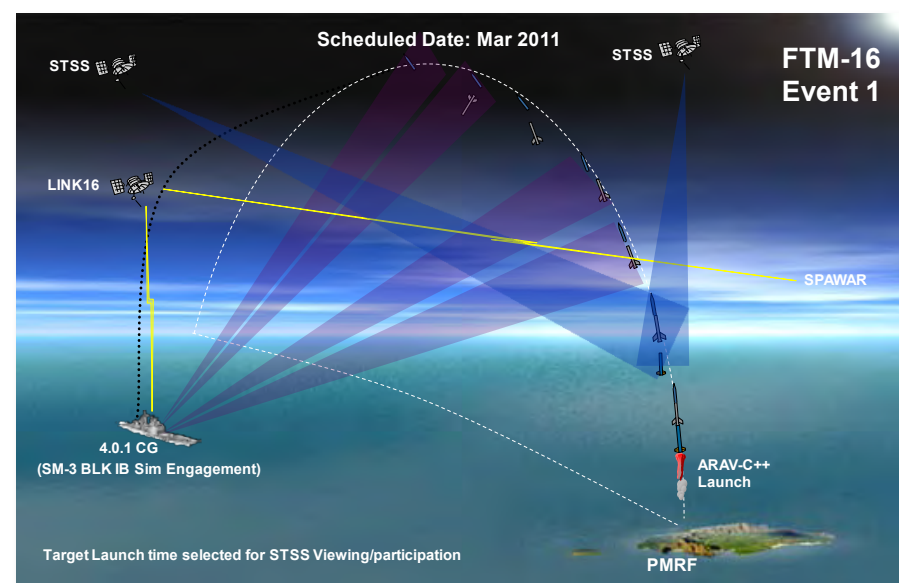
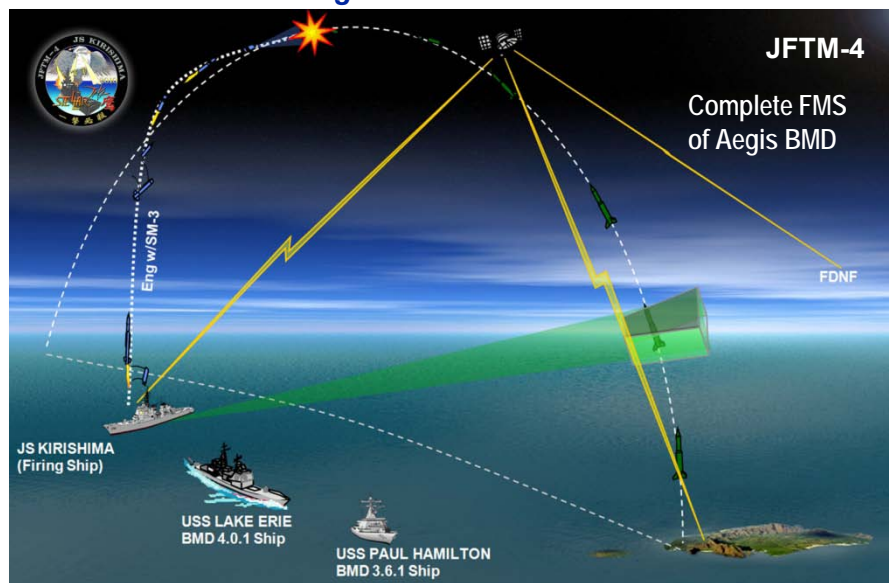




FY11 Major At-Sea Test Operations

- Complete Through March 2011-

Aegis BMD





Aegis Ashore Missile Defense Site

Aegis BMD



**Aegis Ashore
Proposed Laydown
at Romanian Site**

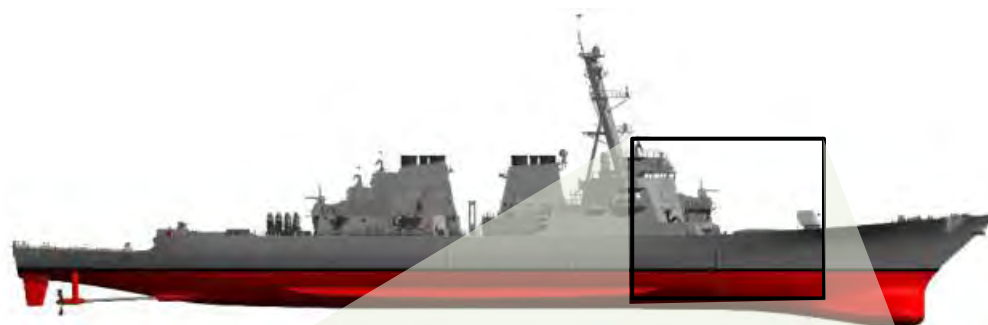
Aegis Ashore Conceptual Drawing





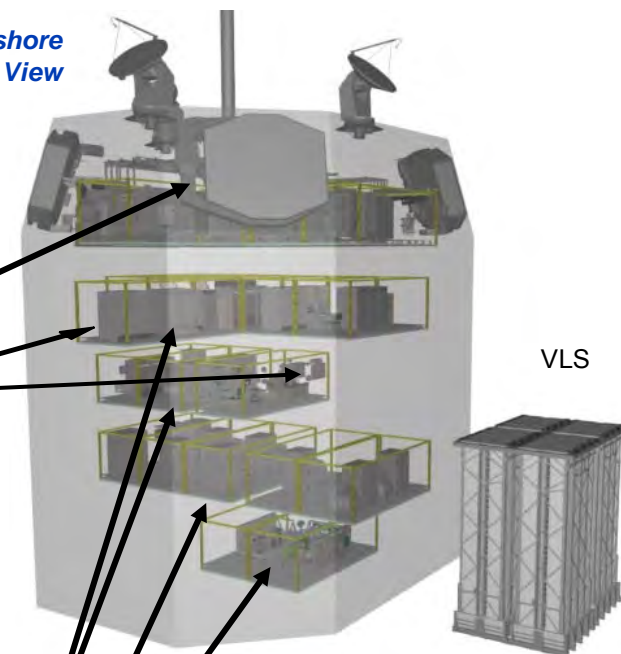
Aegis BMD Transition From Sea To Ashore

Aegis BMD



U.S. Navy Destroyer (DDG 113)

*Aegis Ashore
Conceptual View*



VLS

SPY Radar and FCS

CSMC

CIC

VLS

Processors

Power Supplies

Water Coolers

Acronyms:

FCS

Fire Control System

CSMC

Combat System Maintenance Central

CIC

Combat Information Center

VLS

Vertical Launch System



Aegis BMD Life Cycle Management Process

Aegis BMD

- **Deputy Secretary of Defense Memorandum, 10 June 2011 defines funding responsibilities for BMDS elements:**
 - **MDA is responsible for funding research, development, test/evaluation for BMDS capabilities, and procurement and sustainment of BMD-specific mission equipment and initial spares**
 - **Following initial fielding of a BMDS element, MDA will fund the first two years of operations for BMD-specific mission equipment**
 - **MDA will fund construction of mission essential facilities and security infrastructure**
- **Supersedes 2007 Transition & Transfer Memorandum as approved by Deputy Secretary of Defense governing O&S support of prior agreements between MDA and Navy**

- Aegis BMD capability is at sea
- Aegis BMD is operationally suitable and effective
 - Demonstrated ability to defeat short, medium and intermediate range ballistic missiles
 - EPAA Phase I architecture demonstrated
- Force structure capacity and capability increases rapidly over the next 5 years





Aegis Ballistic Missile Defense

Aegis BMD



Forward...At Sea...On Patrol

Enabling Capabilities, Providing Options for U.S. and Allies